MANUFACTURERS' DIRECTORY—APRIL, 1940—25c

ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

IN cooking TOO
WAYS HAVE CHANGED
HORSE AND BUGGY COOKING IS
TIME TO GO ELECTRIC WHE
The "good old days" are gone forever
cook are here! Modern cooking is electric
electric light. It actually costs no more to cook
all the others with the new electrics before you
cooking is so
COMPARE
before you buy
SOUTHERN CALIFORNIA EDISON
COMPANY LTD.
IN cooking, TOO
WAYS HAVE CHANGED
SWITCH TO THE NEW WAY...LOOK AT
ELECTRICS
Electric cooking is the modern way to cook. It is as superior to other cooking methods as
electric light is to a coal oil lamp. And do you realize that electric cooking, with all its advan-
tages, costs no more? Before you buy any range, you owe it to yourself to compare all the
others with a modern electric range. See the new electric ranges now at your dealer's store.
COMPARE
before you buy
COMPANY LTD.
"Compare before you buy"
Promotes Electric
Range Sales
IN cooking TOO
WAYS HAVE CHANGED
BE MODERN .... "LOOK AT ELECTRIC" WHEN YOU LOOK FOR A NEW RANGE
When you board a modern streamlined train, you're due for a new
travel thrill ... and when you cook
your first meal the modern electric
way, you'll wonder how you ever
managed with any other cooking
method. Yet the advantages of mod-
ern electric cooking actually cost
no more! Compare all the others
with the new electrics before you
buy any range. See them to-
day at your dealer's store.
COMPARE
before you buy
SOUTHERN CALIFORNIA EDISON COMPANY LTD.
IN cooking TOO
WAYS HAVE CHANGED
WHEN YOU LOOK FOR A NEW RANGE . . .
"LOOK ELECTRIC"
Modern ways are best. A turn of the faucet, and
there's all the clean, pure water you need. Switch on
your modern electric range, and there's clean, dependable,
controlled heat, automatically maintained at the proper cook-
ing temperature. Modern cooking is electric cooking ... and it
costs no more! Compare all the others with the new electrics
before you buy any range. See them at your dealer's store.
COMPARE
before you buy
SOUTHERN CALIFORNIA EDISON COMPANY
LTD.

A superior product helps sell itself. That is why Edison advertising urges prospective range buyers to see the new electric ranges at their dealer's store before they buy — supports your sales efforts by bringing more range prospects into your store.

4-40

SOUTHERN CALIFORNIA Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), April, 1940. Vol. 84, No. 4. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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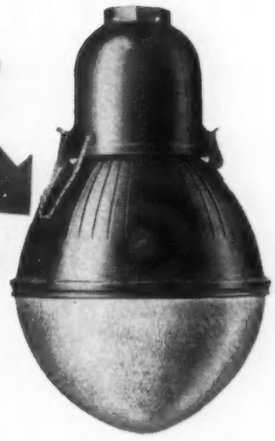
We STEPPED the Reflector and Reduced Temperatures at Lamp-stem 278° F



One Reason Why You Should Prefer the Form 79 Luminaire

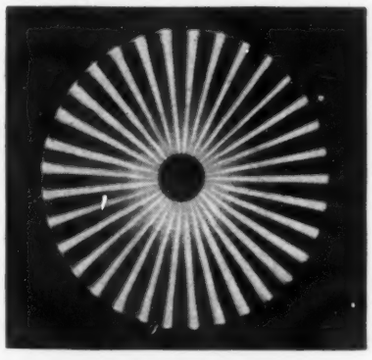
Only General Electric offers this stepped reflector—the lamp-saving feature that made possible deep-bowl reflectors of inherently high efficiency in properly directing light to the pavement without objectionable glare. Smooth circular reflectors must reflect the radiant energy back through the focal axis of the lamp, and this concentration of energy causes short lamp life. G.E. overcame this serious high-temperature problem with a paraboloidal-ellipsoidal reflector and 48 offsets that redirect light rays around the focal axis. Tests show that lamp-stem-position temperatures in the Form 79 luminaire are 278 deg. F cooler.

And this G-E improvement costs you no more. It is one of the ten extra features available at no extra cost. Investigate the possibilities of using this luminaire for more attractive, more economical lighting. Just call the nearest G-E office or write General Electric, Schenectady, N. Y.

ONLY THE FORM 79 HAS 10 EXTRA FEATURES AT NO EXTRA COST

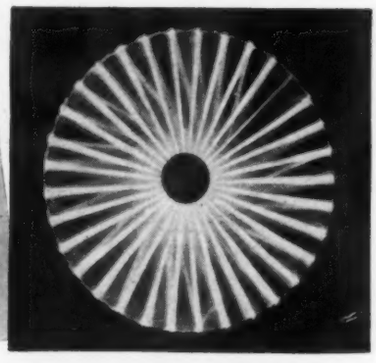
1. Stepped (lamp-saving) reflector
2. Spun-sealed globe holder
3. Reconditioned reflector exchange
4. Durable Glyptal finish
5. Machined joint between hood and reflector
6. Die-cast aluminum hood
7. Heavier pressed globe with chip-proof edge
8. Larger ornamental globe (optional)
9. Available for Type H mercury lamps
10. Choice of three globe holders

Smooth circular reflectors reflect radiant energy back through the focal axis. The result—a serious high-temperature condition that causes short lamp life.



Photograph of the light distribution in a horizontal section through a luminaire with smooth reflector. Rays of light coming from the lamp are reflected back along the same path through the focal axis.

Stepped reflectors redirect light rays slightly to one side of the lamp stem. The result—cooler stem temperature and longer lamp life.



Rays of light coming from a Form 79 reflector, which is stepped with vertical flutes, are reflected slightly to one side of the focal axis and lamp stem.

GENERAL ELECTRIC

452-1

BETWEEN THIS MONTH'S COVERS

Utility Need

MORE NET REVENUES FOR THE UTILITIES (p. 27). Vice-president in charge of business development, Central Service Corp., Chicago, V. H. Moon puts his finger on what he feels can be the salvation and preservation of many utilities. He believes that the utility not only needs greater net income but that it is entitled to it. Declaring that the surest way of losing business is to quit promoting it, Moon says that utilities should go after the domestic field tooth and nail, for therein lie more net revenues, due to the highest average rates per kw.-hr.

Readin' and Writin'

THE LITTLE OLD RED SCHOOLHOUSE GOES MODERN (p. 30). The type of schoolhouse your grandfather or possibly yourself attended is being modernized these days to take care of lighting and heating conditions that are needed to give schoolchildren healthful eye and body comfort. This new equipment is also giving these children in rural areas an early education in the many uses of electricity.

Power Factor

P. F. AS APPLIED TO FLUORESCENT (p. 32). C. R. Benson of the Transformer Division, General Electric Co. at Emeryville, Calif., discusses the matter of power factor correction in the fluorescent lighting field, and how people in the industry itself may be educated to a better knowledge of power factors. By simple analogies, Benson brings several phases of everyday living into mind and compares them to power factor. Departing from these, he explains in actual electrical terms other power factor problems and how they may be explained or solved.

Fascinating Field

LITTLE WOMAN IN BUSINESS (p. 36). Although she is no longer connected with electrical merchandising, Ethel Burke Wheat declares that she was prompted to write this article by some recent examples of indifference and apathy toward what is to her a fascinating field. Her husband is now division supervisor of industrial sales, Southern California Edison.

Engineer's Viewpoint

POWERING THE GREAT VALLEY (p. 42). In the middle of California lie the great Sacramento and San Joaquin Valleys, where 6 billion kw.-hr. of electric energy are consumed each year. Soon, a quarter of this amount will be available from federal Shasta plant at the north end of the valleys. Lester S. Ready, prominent San Francisco consulting engineer, turns a critical, objective eye on various proposals for distributing this power. He believes maximum economy to the consumer will result from making full use of existing electrical facilities. He sets forth a plan wherein these facilities could be used while guaranteeing public agencies rates fixed on the price paid for project power.

Cutout Cuts in

BLOWING-IN A BOOSTER (p. 45). When a booster transformer is temporarily installed to improve voltage for a large customer (or on other feeders) it is sometimes a problem to connect the unit without interfering with service. D. S. Young, electrical superintendent of an Alaskan utility, employs a scheme wherein the blowing of a fused cutout automatically puts the unit on the line.

For Thin-Load Area

WHERE UNIT STATIONS FIT INTO PG and E's DISTRIBUTION PLANT (p. 46). More and more, utilities are exploiting the advantages of substations which are delivered by the manufacturer in one package—almost as simple to connect as a home appliance. R. B. Kellogg, of the PG and E engineering department, tells about two installations in load areas that are typical of those in which more unit substations will be used.

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Cover: Photographer Bill Saunders went down to Graybar Electric Co., assembled these various pieces of electrical equipment and shot this very fine picture of them.

Cooking Up Economies

DATA SHEETS (p. 49-50). Operating figures on a device for cooking enamel and another for cooking steaks.

Poult Problem?

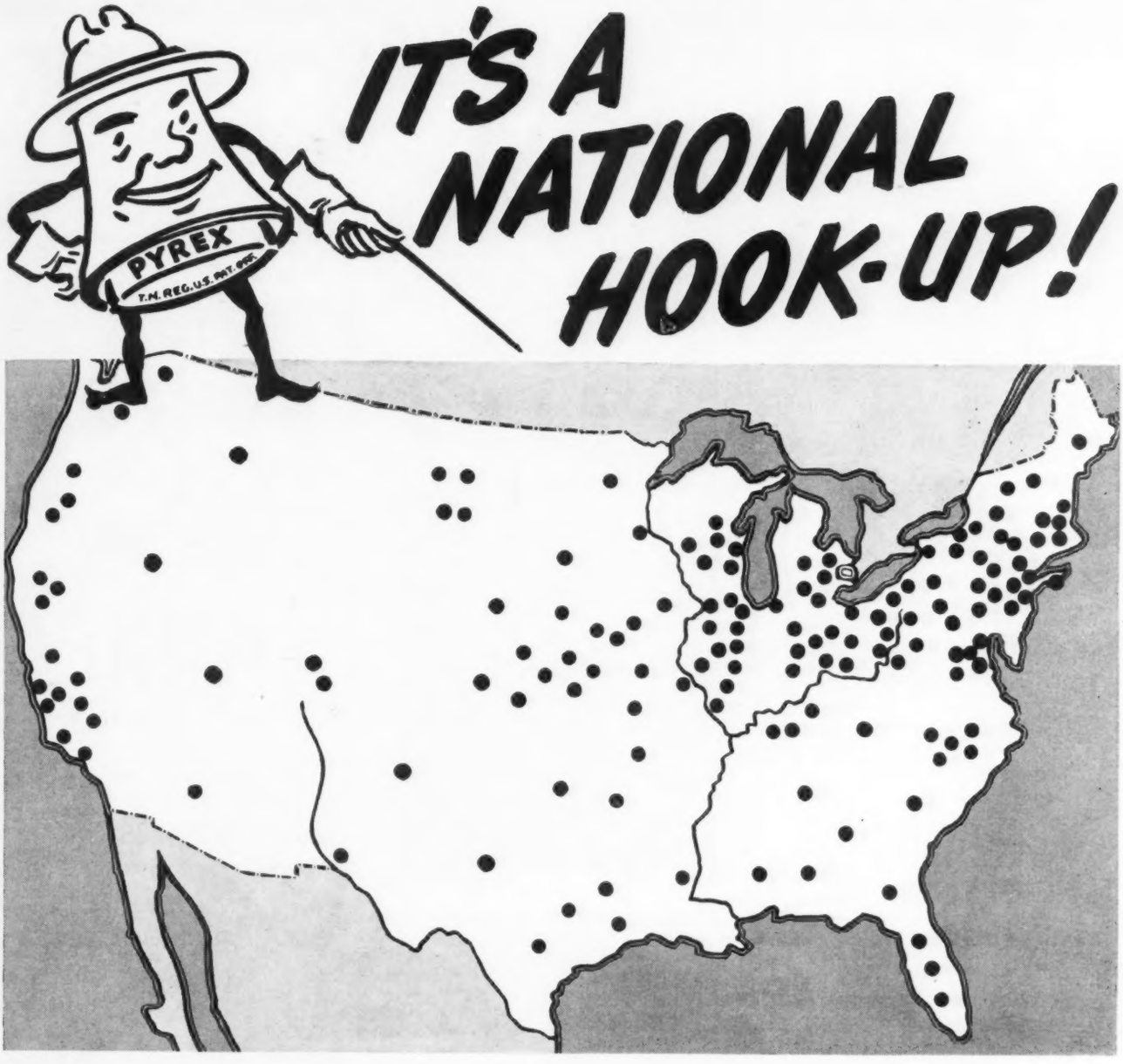
ELECTRIC BROODER (p. 51). According to G. H. Bliesner, agricultural engineer with the Bonneville administration, turkey raisers have found a real friend in the new electric brooders. He cites the phenomenal success of a turkey raiser in Oregon, who prior to using electric brooders, used everything from a Dutch oven to a coal stove.

Northwest Confab

"MEN AND METHODS" (p. 54). Young executives, "old timers" around the Northwest, were on hand to deliver principal addresses at the Business Development Conference of the Northwest Electric Light & Power Assn. held in Seattle recently. These headliners were not only good, but the supporting "cast" was superb, too. And chairman Pat Johnson's informal conducting of this meeting set a new high in cordiality at a conference.

Stop the Presses

NEWS OF THE INDUSTRY (p. 64). PUD tax funds ruling is disclosed by Attorney General in state of Washington . . . PUD organization in Washington reunited on Puget Sound Power & Light condemnation proceedings . . . San Francisco Electrical Contractors Assn. get indictment withdrawal . . . Imperial Irrigation officials reject Nevada-California power proposal . . . Grand Coulee abandons plan to purchase distribution system . . . Seattle to conduct illumination experiment . . . Supreme Court to review Hetch Hetchy case . . . Portland General Electric announces changes in personnel . . . Breuner re-elected head of Electric Appliance Society of Northern California . . . Waters new president of Telluride Power . . . James Kearney, Sr. succeeded by James Kearney, Jr.



Pyrex Insulators are used by leading companies in every State in the Union!

TODAY, in 48 states from coast to coast, PYREX brand Insulators are serving more than 126 leading public utilities and private companies; giving 24-hour performance in heat, cold, rain and snow. Where the going is toughest, you can always depend on PYREX Suspension Insulators for (1) mechanical and electrical strength well above the average, (2) superior long-time strength, (3) higher impact-resistance, and (4) greater resistance to temperature changes. Marked points of superiority will likewise be found in PYREX Pin Type Insulators. Twenty-one agents are conveniently located to serve you. Contact your nearest agent or write us direct for full information. Corning Glass Works, Insulation Division, Corning, N. Y.

CORNING *means* Research in Glass

Pyrex Insulators BRAND

PRINT IN BINDING

The CHANCE ROCK ANCHOR does the job alone

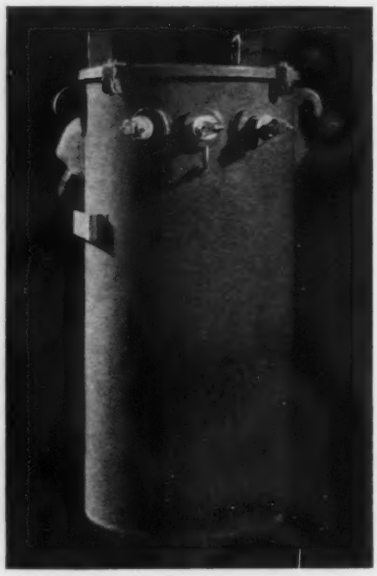
There is no need for carrying lead and heating equipment or concrete mixing materials on the job when you use Chance Rock Anchors for anchoring in solid rock. The only equipment necessary is a rock drill. To install the anchor—drill a hole, drop the anchor into the hole and expand it by turning the rod. The large tripleye admits a bar for use as a wrench. The expanding action wedges the anchor into the hole, and the pull on the rod increases this wedging. Ask the Chance man or your jobbers salesman for a demonstration.

ABC INDUSTRIES
A·B·CHANCE CO. CENTRALIA MISSOURI

NEW PRODUCTS

Transformer (401)

A new distribution transformer, embodying new features of design and construction is now manufactured by Allis-Chalmers. Cadmium plated 3-way terminals increase wiring flexibility over the former two-way terminals by allowing leads to enter the terminal from any one of three directions. Tanks are of durable steel construction, tested under pressure oil leakage. Side walls extend below the



bottom to give protection in handling and to prevent rusting. The tank surface is bonderized and then covered with three coats of baked-on paint. Double conductor insulation is used in these new units to give di-electric strength and greater physical separation of turns.

Electric Water Heater (402)

The All-Purpose electric water heater recently introduced by the Wesix Electric Heater Co. is called the Super-Six. It has two powerful full-sized heating units instead of the usual one; six thousand watts instead of three. The tank holds 32 gals., heater rates 6 kw., 230 volts (3 kw. maximum load.) According to the company heat losses are cut in half by the Thrift Switch, which enables one to have a continuous supply of hot water without wastefully heating the whole tank. Another thrift feature is the Heat Trap, which prevents heat losses resulting from needless circulation in service pipes. A service arm-hole enables a serviceman to clean bottom of water tank.

PAINE *Improved* Cable Clamp

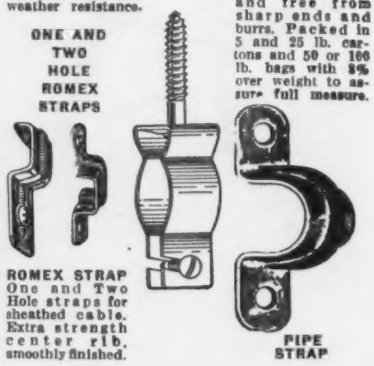
For use on cross arms, overhead beams, etc. Paine patented slot permits rapid installation . . . no fumbling or guesswork . . . slip the bolt with the nut already on into the slot and tighten. Lag screw is gimlet pointed and securely riveted to the clamp . . . clamp is galvanized for rust and weather resistance.

PAINE
Anchors · Hangers
Superior Features
BUILDERS SPECIALTIES

PAINE PIPE STRAP

Prominent center rib adds extra strength, assuring maximum holding power. Uniform gauge materials, accurately punched. Snug, form fitting, and free from sharp ends and burrs. Packed in 5 and 25 lb. cartons and 50 or 100 lb. bags with 5% over weight to assure full measure.

ONE AND TWO HOLE ROMEX STRAPS



ROMEX STRAP
One and Two Hole straps for sheathed cable. Extra strength center rib, smoothly finished.

PIPE STRAP

PAINE

THE PAINE COMPANY
2975 Carroll Ave. Chicago, Ill.
Western Warehouse and Sales in
Los Angeles, Seattle, San Francisco, Denver

NOW IN THE *Lowest* PRICE RANGE

A HEAVY DUTY GROUND ROD CLAMP

Designed with Pressure Bar to align wire with rod and distribute pressure of set screw over a longer surface, ensuring highest efficiency—Constructed with large set screw to give greater tightening ability — Specify Blackburn Groundgrips on your next order.

JASPER BLACKBURN PRODUCTS CORP.
Main and Clinton Sts. St. Louis, Mo.

THERE'S NOT ANOTHER STOVE MADE LIKE THIS HOTPOINT.. SEE WHAT I MEAN?

THE ELECTRICIAN in Hotpoint's sensational new feature-length sound movie, "BLAME IT ON LOVE," puts more good old down-to-earth "sell" in his explanation of the Hotpoint Electric Range than you could ever imagine—and it's NOT high pressure. Write for information about this great promotion today!

Hotpoint Retailers Cheer!

Besides the great "BLAME IT ON LOVE" promotion, Hotpoint gives you a grand new line of range models with Measured Heat, the outstanding electric cooking feature of the year.

THE NEW CENTURY
—a price leader with:

- **New self-cleaning Calrod.**
- **One-piece top of stain-resistant enamel.**
- **Three Select-a-Heat Calrod units with 5 Measured Heats.**
- **Oversize 6-qt. Thrift Cooker.**

MADE TO RETAIL AT

$99.50

in most localities

(Lamp and timer available at slight additional cost)

THE CENTURY. *A 39-inch automatic electric range with Hotpoint quality features at lowest price in Hotpoint history.*

HOTPOINT Appliance retailers from coast to coast have applauded and acclaimed Hotpoint's new feature-length sound movie, "BLAME IT ON LOVE," as the greatest electric range promotion event in appliance history.

And there is good reason for such overwhelming enthusiasm because...

- BLAME IT ON LOVE makes YOUR store the center of appliance buying in your community—develops store traffic because people come to YOUR showroom for free tickets to the big show—focuses the spotlight on YOUR store as headquarters for Hotpoint Electric Appliances.
- BLAME IT ON LOVE dramatizes, glorifies and sells electric cooking and the Hotpoint Electric Range as it has never been sold before.
- BLAME IT ON LOVE gives you the opportunity of a lifetime to tell a 54 minute uninterrupted story about Hotpoint Electric Ranges to an audience which you select yourself. Makes your selling job easier.

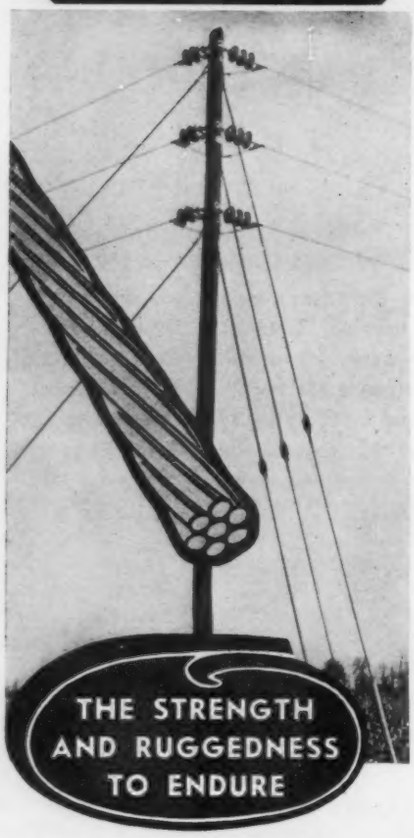
Plan now to lead the parade in your town! Stage the BLAME IT ON LOVE promotion. Ask your distributor for details or write

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 West Taylor Street, Chicago, Illinois

ELECTRIC **Hotpoint** RANGES

REFRIGERATORS • WATER HEATERS • WASHERS AND IRONERS • CLOTHES DRYERS • DISHWASHERS • ELECTRASINK

Crapo
GALVANIZED STEEL
STRAND
Guy and Messenger



ALL the strength and durability practical needs require are combined—with definite economy—in Crapo Galvanized Steel Strand.

The superior tensile strength and ruggedness that only steel can provide .... the heavy, ductile, tightly-adherent protective zinc coatings .... the ability to last beyond the normal replacement period .... the comparatively low first cost of the material .... low maintenance expense .... are all significant factors in the selection of Crapo Galvanized Steel Strand for the more important construction jobs.

Crapo Galvanized Steel Strand is readily available in all standard grades and sizes from representative jobbers.

Crapo Galvanized Products also include Crapo HTC-130 and HTC-80 Steel Conductors (Solid and Stranded 3-Wire), Construction Wire, Tie Wire and Ground Wire.

INDIANA
STEEL & WIRE CO.
MUNCIE, INDIANA

Ozone Generator (403)

A practical, simple ozone generating unit to be used in conjunction with electric fans, has been developed by the Russell Electric Co. This attachment, known as the "Ozonator" is a small cylindrical unit which produces its effect by an electrical discharge. It weighs 3½ lbs. and is furnished with an ad-

justable clamp so that it may be readily attached to the upright member of a circulator fan or fastened to a wall. Housing is made of durable metal, chromium plated. Current consumption is less than 10 watts.

Insulators (404)

Non-radiating insulators have been introduced by Porcelain Products, Incorp., which because of their type glaze eliminate radio interference generated by the insulator at voltages considerably higher than those pre-

scribed as NEMA suggested standards. The glaze adds to the strength of the porcelain, is smooth, will not cause conductor wear. This glaze is designed as Type N.

Safety Switch (405)

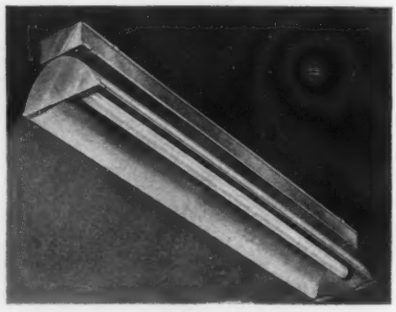
Latest addition to the Colt Safety Switch line is the new type "D", a ruggedly built and efficient Dualbreak mechanism. The cabinet is compact and furnished with plenty of knockouts. Two separate groups of neutral terminals—one grounded to cabinet located at upper end of box for service installations—the other designed for insulated neutral applications located at lower end of switch block—are included in this new switch. It can be supplied in raintight, weatherproof enclosure of galvannealed steel, baked aluminum finish.

Dimmer (406)

A modern and improved device for controlling lamp brilliancy is now being manufactured by Ward-Leonard Electric Co. Known as the Autrastat Dimmer, it not only provides smooth, flickerless dimming but also permits greater flexibility in loading and operates at high efficiency. The unit has the characteristics of an auto-transformer.

Flu-o-Flector (407)

For more attractive show windows of daylight, or natural color, and higher light intensities at same current cost, a new development is available in the Show Window Flu-o-Flector, designed specifically for use with fluorescent lamps by The Edwin F. Guth Co. This unit provides excellent light coverage for both deep type and shallow type windows.



The reflectors are made of genuine Alzac aluminum to give maximum light "punch" and light output. Latest high power factor accessories with separate starter switches are included in this equipment.

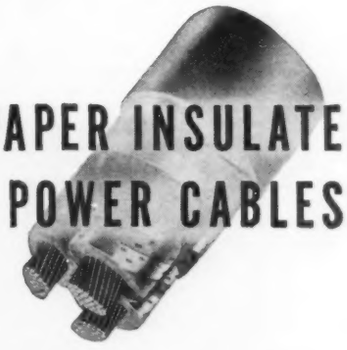
Infrared Drying Lamps (408)

Four new infrared drying lamps in 250- to 1000-watt sizes, designed for industrial or commercial drying and heating jobs, have been introduced by Westinghouse Lamp Division. The line can be used on 105- to 120-volt circuits. Rated laboratory life of all the new drying lamps is in excess of 5,000 hours. The 250-watt reflector drying lamp is a self-contained lamp and reflector, incorporating a metallic reflecting coating which is applied to the inside of the specially-shaped blown glass bulb, then hermetically sealed in the bulb, and thus protected from dust, dirt, moisture and deterioration.

Air Heaters (409)

A new line of wall and floor-mounted air heaters constructed to solve heating problems for specific applications, has been announced by Westinghouse. They are designed for use with either three-heat hand switch or a Westinghouse Type AA thermostat, and have a rating of 1,000 to 4,500 watts, operating on 115, 230 or 440 volts.

From Magnet Wire to



PAPER INSULATED POWER CABLES

OVER 60 TYPES OF ROEBLING (JAR) ELECTRICAL WIRES AND CABLES

Rubber Covered Wires and Cables: Code; Performance; and Heat Resisting; Plain Rubber 60% sheath Power Cable and 40% and 60% sheath Flexible Cords

Power Cables: Paper; Cambric; Rubber

Parkway Cable,
metallic and non-metallic

Service Entrance Cable

Slow-Burning Wires and Cable

Weatherproof Wires and Cable

Police-Fire Alarm Cable

Appliance Cords

Annunciator and Blasting Wire

Network Cables

Magnet Wire

Welding Cables

And a wide variety of other wires and cables; either Standard or to Customer's Specifications

QUICK SHIPMENT

Prompt Service is available at all offices and warehouse points listed below, where large stocks of a wide variety of standard Roebling Wires and Cables are always on hand. Your request for information, prices or samples will be welcomed.

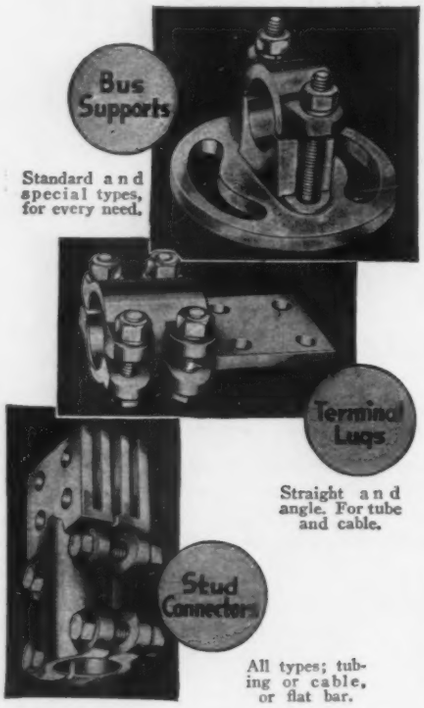
JOHN A. ROEBLING'S SONS CO. OF CALIF.
San Francisco, Los Angeles, Seattle, Portland

IF IT'S ELECTRICAL WIRE OR CABLE **ROEBLING** HAS IT!

Preferred *because they are* **Dependable**

The leading utility companies and "industrials" use PENN-UNION fittings to make certain of *dependable* connections.

They know that *every* Penn-Union fitting is carefully designed and manufactured . . . thoroughly tested.



Standard and special types, for every need.

Straight and angle. For tube and cable.

All types; tubing or cable, or flat bar.

These fittings are high conductivity copper alloy, with machined contact surfaces.

More than 6,200 items in the Penn-Union line . . . for every type of electrical connection . . . including many NEW and IMPROVED fittings. Write for Catalog.

NICHOLAS & COOK
1063 HOWARD STREET
SAN FRANCISCO

J. W. WATKINS
538 SKINNER BLDG.
SEATTLE

PENN-UNION ELECTRIC CORP., Erie, Pa.

You'll find it in the *complete* line

PENN-UNION
Conductor Fittings

Standlite (410)

An improved Indirect Standlite for gasoline service stations has been developed by the Goodrich Electric Co. It is designed for illuminating areas which require evenly diffused light, absolutely free from glare and shadows. The Indirect Standlite produces a

Indirect Standlite

uniformly high intensity of light over the surrounding ground area, yet it is possible to look directly into this fixture from any angle, without experiencing the slightest eye discomfort.

Resistor (411)

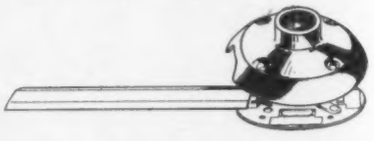
Marking a departure from the conventional tubular type, the Blue Ribbon resistor manufactured by Hardwick, Hindle, Inc., is more in keeping with modern trend of compactness. Resistance wire is accurately spaced wound upon a Steatite core of elliptical cross section having a maximum thickness of ½ in. at its minor axis. The entire element is then embedded in fused vitreous enamel. Advantages claimed are higher wattage rating per unit space requirement—ease and economy of mounting, either singly or stacked—lower inductance.

Angle Socket (412)

A new angle socket has been added to the "Plug-In" Strip line of the National Electric Products Corp. The accurate factory-made 6 in. spacing guarantees uniformity and eliminates careful measurement. Lumiline, tubular, and standard shaped lamps may be interchangeably used and lighting arrangements changed at will. The new angle socket will accommodate standard lamps from 15 to 100 watts, inclusive.

Brass Utility Box (413)

A new brass utility box fitting for use with a Wiremold "pancake" overflow raceway wiring system is now available through The Wiremold Co. Designed to take any standard ¾ in. stem type floor outlet for power and



light or telephone circuits, this utility box is of extra-heavy construction, and offers a sturdy base for fittings. It will meet heavy-duty service requirements.

MERCILESSLY ABUSED

Racked—Tortured to the Limit—
Tested to the Point of Destruction—

NATIONAL *Nicopress* **DEAD-ENDS**
SHOW MAXIMUM STRENGTH—
TIGHTNESS AND ENDURANCE

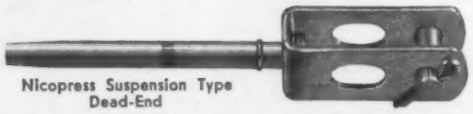
BUILT TO WITHSTAND VIBRATION!

When you use a Nicopress Dead-End you will have absolute assurance that it is as strong as the wire itself, tight as a weld and will stand up under the severest strains of vibration. And the reason—

Never is a type or size of Nicopress Dead-End passed for distribution until it has been put to the most exhaustive tests on specially constructed tensile and vibration machines. Always must the Nicopress Dead-Ends equal or exceed the rated breaking strength of the conductor. Never can the conductors pull out of completed Dead-Ends. And always must Nicopress Dead-Ends stand up under vibration tests that equal or surpass any that they would be subject to under rigorous field conditions. That's why satisfaction can be assured.

They are strong. They will hold. They have endurance. And they are mighty easy to install. Get full information and samples today.

Nicopress Offset Type Dead-End.



Nicopress Suspension Type Dead-End

THE NATIONAL TELEPHONE SUPPLY CO.
5100 SUPERIOR AVE., CLEVELAND, OHIO
Canadian Mfr.—N. Slater Co., Ltd., Hamilton, Ont.
Export Distributor—International Standard Electric Corp., New York, N. Y.

Reset Timer (414)

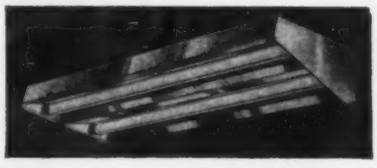
An automatic reset timer has been introduced by The R. W. Cramer Co., Inc. It is a very compact industrial instrument for automatic, accurate timing of a variety of electrical circuits, and consists essentially of an enclosed snap action switch unit which is actuated by an operating arm, driven in one direction by a synchronous motor. Time settings are easily adjusted. Contact has a capacity of 10 amp. at 115 volts or 5 amp. at 230 volts. Instrument can be furnished for flush panel mounting or in dustproof, die-cast case suited for BX or conduit wiring.

Resistor Cable (415)

A new Deltabeston resistor cable is now manufactured by General Electric appliance and merchandise department, and is designed especially for connecting banks of resistors where moisture and heat are prevalent. Insulation of the cable is composed of Flamenol tape next to the tinned copper conductor, then a layer of felted, impregnated asbestos, and finally an overall asbestos braid with a heat-and-moisture-resisting finish. It is available with solid conductor in sizes from No. 14 to .0000, and with stranded conductor from No. 14 to 1,000,000 c. m.

Luminaires (416)

Skylux fluorescent luminaires have been developed by Curtis Lighting, Inc. and according to the company are correctly designed for fluorescent general lighting. Both the twin and single units are 4 ft. in length, using the most efficient fluorescent lamp, 48 in. tube.



These units can be used as individual luminaires or coupled together in long continuous lines to form appropriate architectural patterns of lights. Lamp shielding prevents glare and garish effects.

Fuse Box (417)

A fuse box has been designed by G & W Electric Specialty Co. for secondary network cables. The box is fabricated of ebony asbestos material and is, therefore, only suitable for use in dry vaults. Each phase uses a separate box. Each box provides for fused connection of four 500 maximum cables to a bus which is connected through the solid links and 1000 or 1500 cable to the supply.

Fuse Cutout (418)

A 100-amp. reclosing fuse cutout in 5,000-volt and 7,500/12,500 Gr. Y volt ratings has been introduced by General Electric. Constructed for heavier current duty than G-E's 50-amp. cutout, this unit offers the same advantage of automatic reclosing, maximum economy, sleet proof design, and interchangeability. The entire reclosing mechanism is in the door. Cutout can be purchased complete, or the 100-amp. reclosing door can be purchased separately and put on any 100-amp. G-E indicating and drop-out cutout housing now in service.

RUBBER COVERED POWER CABLE • BUILDING WIRE

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE

It's a Job for

CRESCENT

Service

Entrance Cable

Millions of feet of CRESCENT Service Entrance Cable now in satisfactory service is factual evidence of its high quality. It is tamperproof, resistant to all weather conditions, flame retarding, highly flexible for bending around corners and can be painted to match the color of the building. It is light in weight, eliminates the need for rigid conduit and is made in a complete line to cover all requirements of any installation.

CRESCENT INSULATED WIRE & CABLE CO. INC

TRENTON, NEW JERSEY

WESTERN REPRESENTATIVES

LOS ANGELES — Henger-Seltzer Co. 130 S. Hewitt St.

SAN FRANCISCO — Hodges & Glomb 1264 Folsom St.

KANSAS CITY — W. F. Howe & Co. 2627 McGee St.

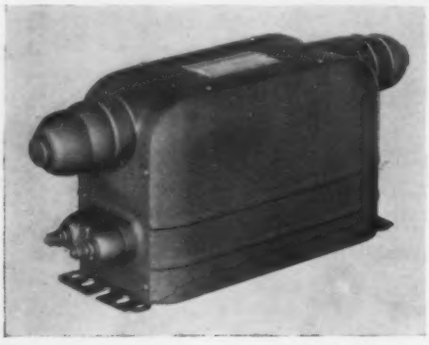
CRESCENT ENDURITE SUPER - AGING INSULATION

Okoprene (419)

Braids that will rot and fray, saturants that can melt, drip or flake off have been completely eliminated in a new design of rubber-insulated cables protected with a bonded sheath made of neoprene. This tough covering, called Okoprene by the engineers who developed it in the Okonite Co., seals the insulation from air and light. Okoprene-protected cables are recommended for voltages up to 5,000 and can be ordered with colored sheaths for phase identification.

Transformer (420)

Installed in 15,000 transformer cases of previous design over a period of 18 months, the space windings and the new insulating compound employed in the "Streamliner," a



new luminous-tube transformer, have been in operation without a single reported electrical failure. Made by General Electric, the "Streamliner" is built to withstand long-time abuse resulting from open-circuit, unbalanced load, and other common operating conditions. High-voltage bushings are water-tight and free from internal destructive corona, reducing possibility of radio interference and lessening stresses on the windings.

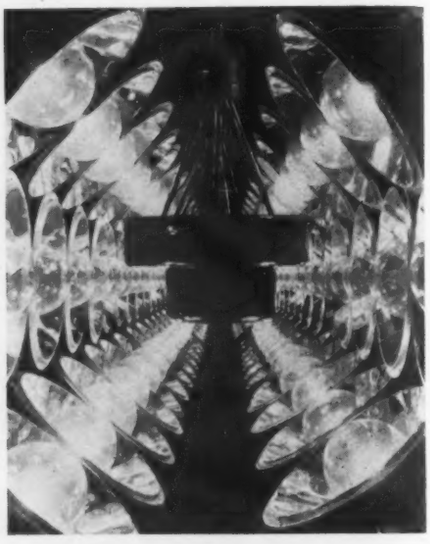
Combination Meter (421)

A combination unit, consisting of a single-

phase Sangamo Watthour meter and a Lincoln maximum demand meter, is offered by the Lincoln Meter Division, Sangamo Electric Co. Designated as Type WDE, the unit is housed in a polyphase type case with single-phase terminal chamber. The Sangamo meter is mounted in the upper part, while the Lincoln demand meter is located in the lower part of the base, with a single glass cover enclosing both meters.

Drying Lamps (422)

Development of a complete line of drying lamps designed to produce effective infrared (heat rays) instead of light, are presented by General Electric. Most powerful of the four infrared sources is a 1,000-watt unit. Of me-



dium intensity is the 500-watt unit. The new line permits users to speed up process drying, expedite surface heating. The average laboratory life of these lamps is in excess of 5,000 hours.

Reset Timer (423)

An almost unlimited number and variety of difficult industrial operations can now be

precisely and economically controlled by the new Paragon Electric Co. series of automatic

CUT THE COST OF CONDUIT BENDING AND PIPE PUSHING

With Greenlee Hydraulic Tools

Hydraulic Conduit and Pipe Benders

Much time and money can be saved by using Greenlee Hydraulic Tools for bending conduit and pipe. Not only do they do the work faster, but they make a better job of it with much less effort on the part of the workmen. They are simple to operate and easy to take to the job. No. 770, shown to the right, bends all sizes of conduit from 1¼" to 3". The larger size, No. 775, bends all sizes from 3" to 4½". Attachments can be furnished for thin-wall steel conduit.

Ask Now for COMPLETE DETAILS

Hydraulic Pipe Pusher

With this hydraulic pusher, one man can stand in a comfortable position and send pipe under streets, sidewalks, lawns, etc., simply by pumping the handles. It saves money and makes it unnecessary to do extensive trenching. Because of its compact design and simple construction, it is easy to set up and move about. Capacity for pipe up to 4".

Greenlee Tool Co., 1703 Columbia Ave., Rockford, Ill.

"We believe the 1940 G-E Refrigerators to be the finest products of their kind ever offered to the American public — and will cost less to own than any other refrigerators at any price."

General Electric Company

MODEL PB-6-40

THIS statement is backed by the finest line of G-E Refrigerators ever built—and prices are not only competitive but also protect dealer profits.

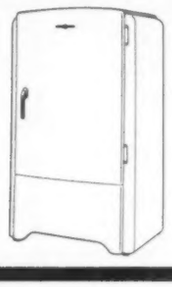
When the public can buy known General Electric quality, dependable performance and enduring economy for so little more than the cheapest refrigerators cost—a G-E is the one they will want.

"THEY'LL DO IT AGAIN IN 1940"

6.2 CU. FT. MODEL LB-6B
with all-steel cabinet, famous G-E sealed-in-steel Thrift Unit, and other features—

$114.75

Prices slightly higher in the south and west.



GENERAL ELECTRIC

Easier for You

BANKING BY MAIL

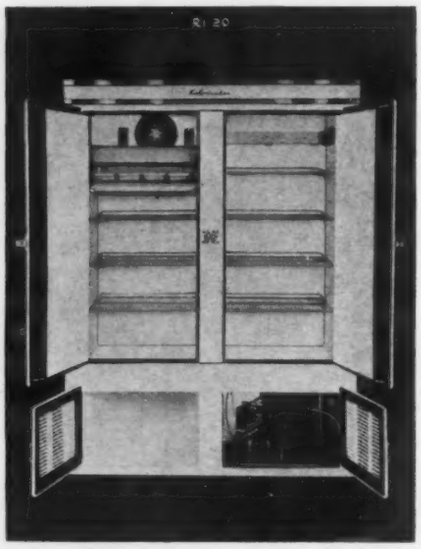
For your own convenience, why don't you use our Bank-by-Mail Service? It's the simplest and easiest way to handle most banking details for your business and yourself. Overnight service to most points in California, and always as handy as the nearest mailbox. We invite you to open an account with us today, by mail.

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
Member Federal Deposit Insurance Corporation

reset timers and time delay relays. These timers are furnished with eight terminals. A positive mechanical lock, magnetically operated, eliminates all friction and magnetic clutches and frees the timer of any disconnect due to vibration.

Reach-in Refrigerator (424)

A new line of reach-in refrigerators, consisting of three models, is presented by the Kelvinator division of the Nash-Kelvinator Corp. All utilize forced-air circulation, be-



ginning with a 20 cu. ft. model up to the 30 cu. ft. capacity unit. The welded outer shell is covered with 20-gauge rustproofed sheet steel, and the front of the base is recessed to provide toe room. The cabinet exterior is finished in Permalux, a long-wearing baked enamel that will not crack, chip or change color and is acid and grease-resisting. An automatic light illuminates the entire food compartment, while an adjustable temperature selector with "on" and "off" switch for the condensing unit is conveniently located on the cooling unit panel.

Plastic Switch (425)

A new and durable compact switch molded from plastic has been introduced by The Hart Mfg. Co. This single pole toggle switch with "Snap-in" Mounting is for ac current

only, and is ideal for controlling fractional hp. motors, fans, signal systems, lamps, relays, hot plates and appliances in general. It employs the slow break principle, permitting smooth operation.

PRODUCT DATA

Keep Posted for 1c

Your being right up-to-the-minute may have an important bearing on your success. New developments are appearing daily in your field—tools to help you do a better job. Are you abreast of them? You fall back a step when the other fellow is well informed about a subject of which you are ignorant. Manufacturers' publications are a quick, efficient way for you to keep posted on current events in your field.

Isn't it a bargain to invest 1c (the cost of a postcard) to help earning power to which you look forward? American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to enjoy this service for your own. Check and mail the coupon below. That's all you have to do to help yourself toward better performance and greater rewards.

Ward-Leonard Catalog (426)

A revised and up-to-date catalog has been published by Ward-Leonard Electric Co., covering their products from resistors to laboratory equipment. The various combined bulletins describe each item thoroughly, giving illustrations, diagrams and dimensions together with price lists.

Briegel Method SCORES on Golden Gate Exposition Conduits!

"It's Easy, Simplified, Time-Saving" says this Contractor . .

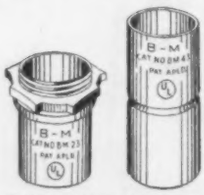
"We have used BRIEGEL box Connectors and couplings with "Thinwall Conduit" for lighting and fire alarm systems in the Owl Drug Store Building . . . and for the fire alarm systems in 95% of the buildings and palaces at the GOLDEN GATE EXPOSITION, Treasure Island, San Francisco Bay.

"We find there is a saving in the price of material, ease and simplicity of installation, as there are no tools required except a BRIEGEL Indenter."

S. CIMINO,
Severin Electric Co.
San Francisco

TELESCOPE BM SYSTEM

The One Tool Needed Costs Only $1.35



The B-M Connectors and Couplings and patented B-M Indenter are all you need for quick, quality work—and MORE PROFIT on EVERY JOB! Approved by Underwriter's Laboratories.

Distributed By:

The M. B. Austin Co., Chicago, Ill.
Clifton Conduit Co., Jersey City, N. J.
The Steelduct Co., Youngstown, Ohio
National Enameling & Mfg. Co. Pittsburgh, Pa.
Clayton Mark & Co., Evanston, Ill.
General Electric Co. Bridgeport, Conn.
Enameled Metals Co., Pittsburgh, Pa.
Triangle Conduit & Cable Co., Elmhurst, New York City

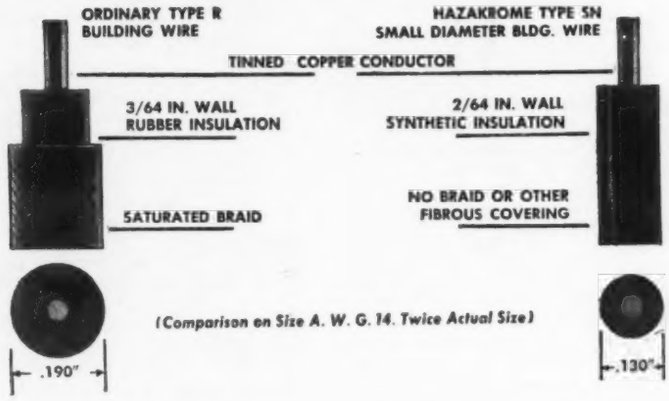
BRIEGEL METHOD TOOL CO., Galva, Illinois

HAZARD RE-WIRING NEWS

Published by the Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

NEW SMALL DIAMETER BUILDING WIRE OPENS A TREMENDOUS MARKET

HAZAKROME Type SN Offers Obvious Advantages For Re-wiring


ORDINARY TYPE R BUILDING WIRE
HAZAKROME TYPE SN SMALL DIAMETER BLDG. WIRE
TINNED COPPER CONDUCTOR
3/64 IN. WALL RUBBER INSULATION
2/64 IN. WALL SYNTHETIC INSULATION
SATURATED BRAID
NO BRAID OR OTHER FIBROUS COVERING
(Comparison on Size A. W. G. 14. Twice Actual Size)
.190"
.130"

Comparative Outside Diameters

A. W. G. SIZE	Ordinary Type R Building Wire Approx. O.D. Inches	HAZAKROME Type SN Small Diameter Approx. O.D. Inches
14 sol.	.190	.130
12 "	.210	.147
10 "	.230	.168
8 "	.280	.227
6 str.	.380	.314
4 "	.450	.363
2 "	.510	.423
1 "	.570	.496
1/0 "	.630	.537
2/0 "	.670	.583
3/0 "	.730	.634
4/0 "	.780	.692

The 60° C. maximum recommended operating temperature of HAZAKROME Type SN as against 50° C. for ordinary Type R wire means greater possible current loadings (see adjacent table).

Comparative Current Loadings

A. W. G. SIZE	Ordinary Type R Building Wire — Amperes	HAZAKROME Type SN Small Diameter — Amperes
14 sol.	15	18
12 "	20	23
10 "	25	31
8 "	35	41
6 str.	45	54
4 "	60	72
2 "	80	96
1 "	91	110
1/0 "	105	127
2/0 "	120	145
3/0 "	138	166
4/0 "	160	193

The values shown above are for 1, 2, or 3 conductors in a single conduit as proposed for the 1940 National Electrical Code.

HAZAKROME ALSO AVAILABLE FOR POWER CIRCUITS

Synthetic Insulation Not Limited To Lighting Circuits.

Rewiring of important power and feeder circuits with larger conductors is made possible with HAZAKROME synthetic small diameter building wire as Type SN is available in all conductor sizes up to and including #4/0.

Small Diameter Wire in Half Inch Conduit Doubles Capacity. Similar Increases for Other Sizes

Where two single phase circuits have been installed in a ½ inch conduit, previous National Electrical Code requirements permitted only 4-#14 wires to be installed. These conductors can be replaced with 4-#10 HAZAKROME Type SN small diameter building wires. Total circuit wattage will thereby be increased from 2800 watts to 5700 watts.

In a lighting circuit this means that the lamps can be doubled in size merely by using Type SN wire instead of ordinary Type R rubber insulation. No conduit changes are necessary.

Type SN Synthetic Insulation Permits Greater Capacity Without Changing Conduits in Old Installations

HEAVIER COPPER OR MORE CONDUCTORS IN EXISTING RACEWAYS AT MINIMUM COST

The ever-increasing quantity of new electrical appliances, equipment such as air conditioning units, higher intensity lighting, etc., have made greater demands than existing wiring circuits are able to carry. Owners of commercial and industrial buildings, apartments and residences were faced with the great expense involved in ripping out small conduit from walls, floors and ceilings to install conduit large enough to carry larger wires.

But, the introduction of small diameter building wire is saving owners this tremendous expense. These new wires are used in existing raceways.

Much work that has been held up because of the great cost of new conduit installation will now be released by owners.

Interest has focused on HAZAKROME Small Diameter Synthetic Insulated Building Wire, which is made in all sizes up to and including 4/0. This slick, easy pulling, braidless Type SN Wire comes in all standard colors. Leatherlike in texture, it resists moisture, flame, oil, acids and abrasion, making it ideal in every respect for the work demanded of it.

APPROVAL

Last December the Electrical Committee of the N.F.P.A. reported its approval of Small Diameter Building Wire. Until the report is formally accepted by the National Fire Protective Association and included in the 1940 National Electrical Code, its use in new work and rewiring is contingent upon approval by local inspection authorities.

ADEQUATE WIRING A REALITY WITH HAZAKROME TYPE SN

4 Distinct Advantages

1 Smaller Diameters
2 Greater Current Capacity
3 Greater Permissible Conduit Fill (about 25% more than for ordinary Type R)
4 Non-inflammable Insulation

Bryant Catalog (427)

A new general catalog is now being distributed by The Bryant Electric Co. Known as catalog No. 40, it includes many new Bryant wiring devices such as new fluorescent lighting devices, large-diameter, porcelain-pull lampholders, clock and outdoor outlets, universal lock switch key, industrial and marine devices and Nofuze load centers. Various classes of devices are arranged for easy selection, and a convenient reference is provided through a pictorial section index and a complete alphabetical product index.

Wagner Catalog (428)

A complete line of equipment for cooling and ventilating by air movement is presented in a Wagner Electric Co. combined catalog. For residential, commercial and industrial use, Fans as a Business and a Sales Idea are "editorials" for Wagner salesmen that are well worth reading. Illustrations of fans and their applications are presented with complete data about them.

Switches (429)

Ease of operation and freedom from maintenance are the outstanding features of the new indoor disconnecting switches described in a booklet issued by Westinghouse Electric. This 28-page, illustrated publication gives complete details of construction and application of the switches. Characteristics of the various units are given, along with factors for determining the correct type of indoor disconnecting switch for individual applications. Line diagrams of each unit are also given.

Fluortest (430)

Fluortest instruments are described and illustrated in a new four-page bulletin issued by the Zephyr-Lite Mfg. Co. These instruments are claimed to be the first testing devices in the fluorescent lighting field, and may be used by lamp distributors, utilities, equipment manufacturers, contractors. Units are portable, easy to operate and are guaranteed against defective material or workmanship.

Lightning Arresters (431)

Lighting arresters, 3, 6, and 9 kv. of new design and construction and a complete line of improved arresters with capacities from 12 to 73 kv.'s are presented in a new 20-page Westinghouse catalog. Diagrams and photographs showing design, structure and test of the newer units appear on pp. 1-7. Performance characteristics, circuit applications, mountings and connections, outline dimensions and specifications of other equipment are shown on the remaining pages.

Square D Catalog (432)

The January, 1940, Western edition of the Square D Digest, published by the Square D Co. is still available. Current prices, new developments and general information regarding the Square D Co. and its products are included in this edition. A handy thumb index enables one to find products in mind, quickly.

Light for Work (433)

"Light for Work" is the title of a new book prepared by The Acme Electric & Mfg. Co. In addition to describing Acme Mercury Vapor Transformers for indoor and outdoor applications, it explains concisely the characteristics of mercury vapor lighting, the various types of lighting systems for specific and general applications. This book may be of considerable reference value in the determining of the proper lighting system for plants, as it includes calculating tables, and charts, which when used according to basic rules established, predetermines the necessary amount of light for various type buildings and work.

Trico Catalog (434)

A new condensed catalog just issued by the Trico Fuse Mfg. Co. is titled "14 Big Trouble Savers." It contains complete specifications and illustrations of powder-packed renewable fuses — non-renewable fuses — plug fuses — thermal time-lag plug fuses — tamper-resisting plug fuses—clamps for locking fuse clips—heavy-duty test clamps—fuse pullers and automatic lubricators for all types of bearing surfaces.

Guth Catalog (435)

A second catalog by the Edwin F. Guth Co. covering Flu-O-Flectors is now available. It includes information on high-power factor ballasts, starter switches, non-radio interference and starting compensators. The line consists of Flu-O-Flector strips, the first practical stock line of fluorescent light strips. Also included are industrial and commercial Flu-O-Flectors for offices, stores, show-windows, showcases, etc.

Air-circuit Breakers (436)

To meet the requirements of sheet and paper mills, synthetic fibre plants, central station auxiliaries and general industrial applications, two air-circuit breakers, stationary and removable, are presented in an eight-page folder by Westinghouse Electric. Breaker units are moved in and out of operating position by a detachable, levering handle. Each unit is equipped with a mechanical position indicator, clearly visible through a hole in the door.

Adequate Wiring (437)

Amply illustrated, a new General Electric publication, "Adequate Wiring for Industry," has been completed. It is a manual of modern wiring methods and materials. The book can be used as a check list in factories to determine whether existing wiring permits efficient production according to modern standards.

G-E Lamps (438)

A four-page folder giving essential technical data and prices on the complete line of General Electric fluorescent Mazda lamps and auxiliary equipment is now available. This folder incorporates information on all the auxiliary equipments necessary for fluorescent lamp operation. It also contains a valuable table on power-factor correction and several connection diagrams.

Electric Fencing (439)

Kwik Klips, a method of fastening fence wire to insulators for electric fencing, is described in a catalog by the Accessories Mfg. Co., together with numerous other electric fence accessories, all of which are new. A large illustration on the back of the catalog shows how to install properly an electric fence.

Fluorescent Uses (440)

Folders covering the various aspects and equipment of the fluorescent lighting field are now available through the Van Dyke Industries. Present uses, applications, advantages and background of fluorescent lighting are offered.

SAVE TIME! USE THIS COUPON

To keep posted, simply circle the items in which you are interested, cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

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441	442								

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* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

THERE ARE "BESTS" IN EVERY INDUSTRY

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Sunbeam

Automatic MIXMASTER
Double Automatic IRONMASTER
SILENT AUTOMATIC TOASTER
Automatic COFFEEMASTER
SHAVEMASTER
FLAT TOASTER • FAN HEATER
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WET-PROOF HEATING PAD
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50 YEARS MAKING QUALITY PRODUCTS

More RANGE SALES for YOU with

CHROMALOX

-equipped RANGES

Sell "TWO-UNITS-IN-ONE" . . . Fast, contact cooking . . . Easy cleaning . . . Attractive appearance . . . And many other features that make CHROMALOX units a sales story with a punch! Get all the facts. Write today.

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THE PETERSON COMPANY
1921 Blake St., Denver, Colo.
EDWIN L. WIEGAND CO.
7540 Thomas Blvd., Pittsburgh, Pa.

Ultra-violet Units (441)

Ultra-violet lighting units for creating fluorescence are outlined by the Keese Engineering Co. in a four-page bulletin just issued. It describes the only complete line of ready to install ultra-violet lighting outfits, with specially designed reflectors and filters for obtaining maximum brilliance of lacquers, enamels, dips, dyes, etc.

G-E Direct-mail (442)

General Electric's 1940 Industrial Heating Load-Building Program is outlined in the 4th quarter, 1939 edition of the "Midget-Giant Load Builder" that describes the G-E direct-mail program, the quarterly news service and sales helps. G-E midget-heating loads are illustrated in the concluding pages, showing the increased kw.-hr. per year these units bring about.

LETTERS

Cover to Cover

DEAR SIRS:

ELECTRICAL WEST and every issue of it is chuck full of valuable and interesting information to all of the industry. I read it from cover to cover and would miss it if I could not get it to read.

BLAINE GUY
Chief Electrical Inspector
Salt Lake City Corp.
Salt Lake City, Utah

Wholesaler-Retailer

DEAR SIRS:

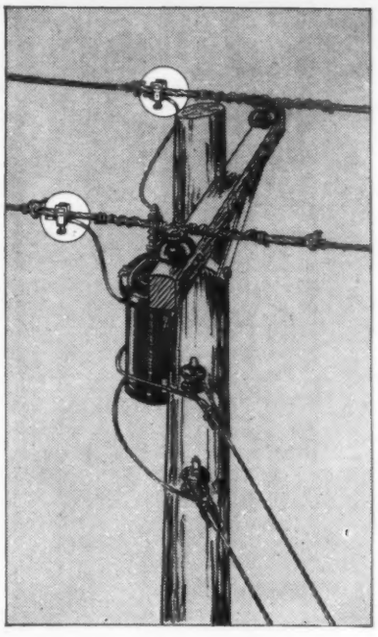
The March issue has an editorial on page 54 dealing with retailer-wholesaler relations. It is a fine idea and a proper place for the wholesaler should be maintained in the scheme of things. There is a school of thought which holds that if the middleman or wholesaler were eliminated prices would be lower. This may have some logic, but could the dealer carry the large stocks which the wholesaler can and does? The obvious answer is no, for one reason because the dealer hasn't enough capital.

A point that ought to be discussed in the near future is that of both the wholesaler and retailer keeping within their own bounds of business. I'm not a wholesaler or a retailer, but simply a power company employee who knows that the activities of any branch of the industry affect the growth and prosperity of all branches.

It's a well known fact that I or almost anyone else can go into a jobber's place of business and get a discount on what we want to buy. The popular slogan is "Why pay more for electrical appliances when you can get them wholesale?" If the wholesaler would sell only to dealers and the dealers only buy from those wholesalers which were ethical, there would be no question about the wholesaler securing and maintaining a proper place in the industry. I'd like to see some discussion on this particular point.

J. O. PAULL,
San Francisco, Calif.

modernize YOUR DISTRIBUTION PRACTICE—



ACSR rural line transformer pole.

Connections made over armor rods.

Straight-thru dead ends of hard drawn copper secondary.

RELIABLE FLIP-ON TAP CLAMPS for ACSR over armor rods combine high strength with light weight and make fine mechanical and electrical joints. Very easy to install. Very low in cost.

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No lengthy assembly and wiring work—no field building of masonry or enclosing structures. Westinghouse metal-enclosed switchgear brings you the best in modern switchgear practice . . . completely assembled, factory-tested and ready to set on your floor.

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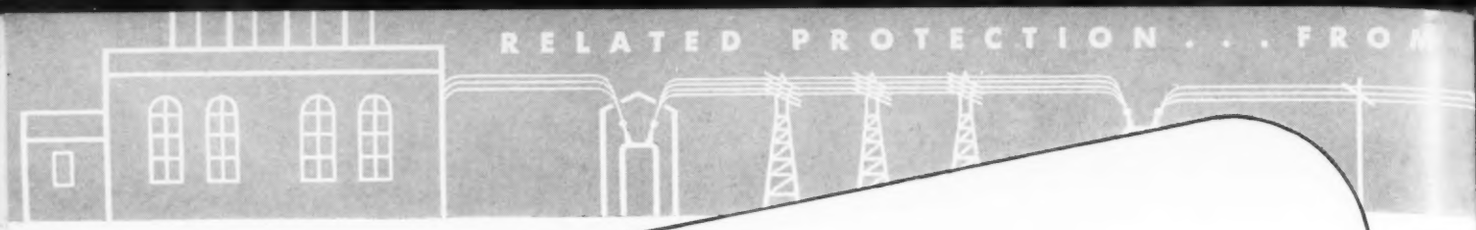

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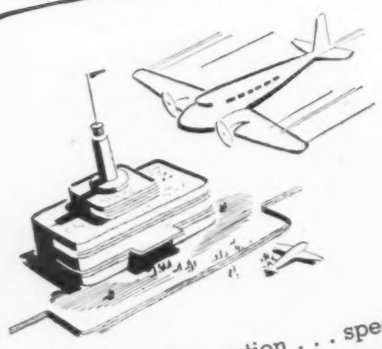

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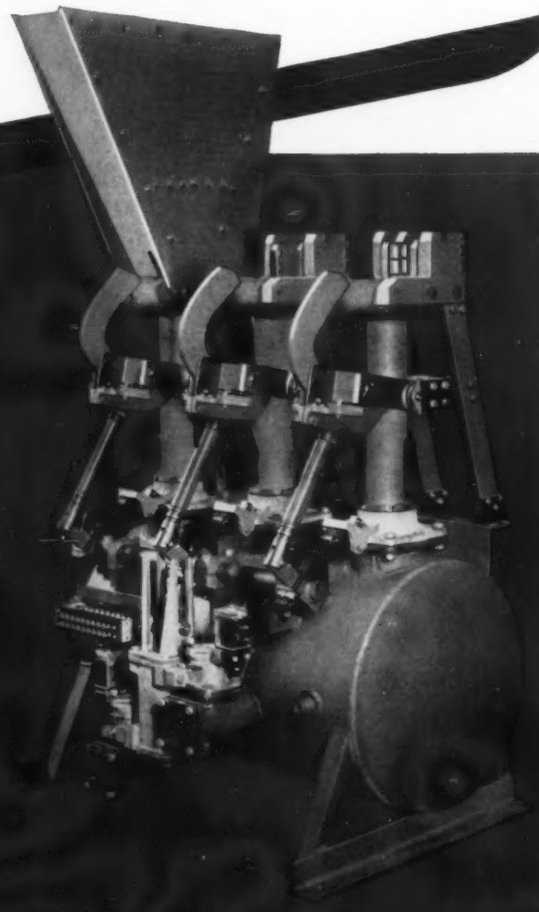
Get the full story on Westinghouse types available from Booklet B-2243, now on the press. Reserve your copy. Write Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania, Dept. 7-N.



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Compressed air action will give this breaker high interrupting speed and capacity. It will be designed in ratings up to 1,500,000 kv-a at 15 kv for indoor service. Tests at full rating during development under characteristic operating conditions insure performance in service.

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FOUR FACTS TO CONSIDER BEFORE YOU BUY AIR BREAKERS;

Only Westinghouse can give you these:

- POWER air circuit breakers proved in service for OVER 10 YEARS.
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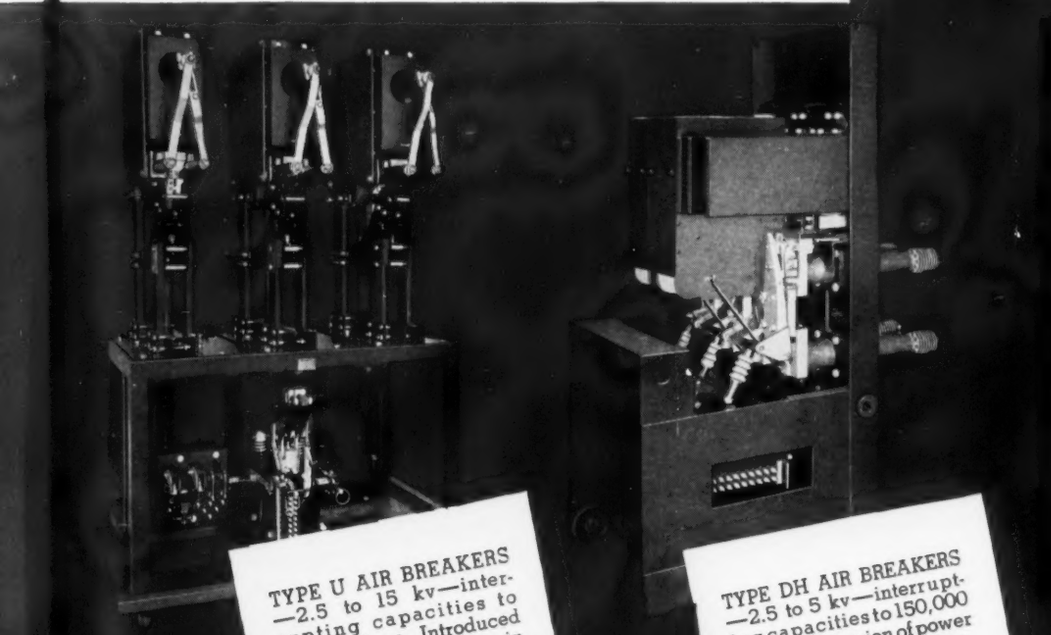

TYPE U AIR BREAKERS —2.5 to 15 kv—interrupting capacities to 850,000 kv-a. Introduced in 1927—hundreds in service since.

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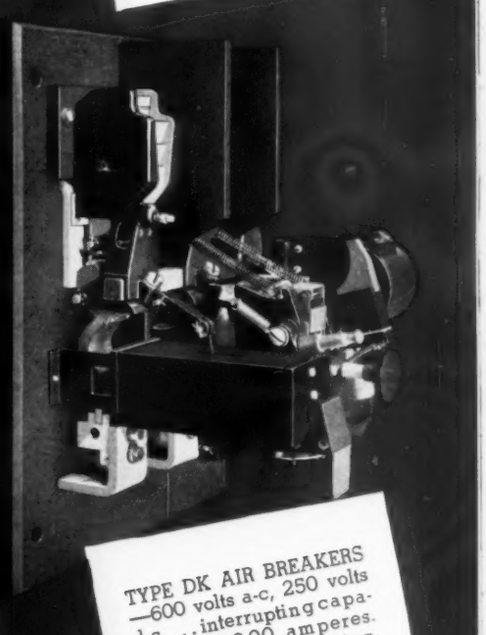

TYPE DK AIR BREAKERS —600 volts a-c, 250 volts d-c, . . . interrupting capacity, 20,000 amperes. Another new Westinghouse development.

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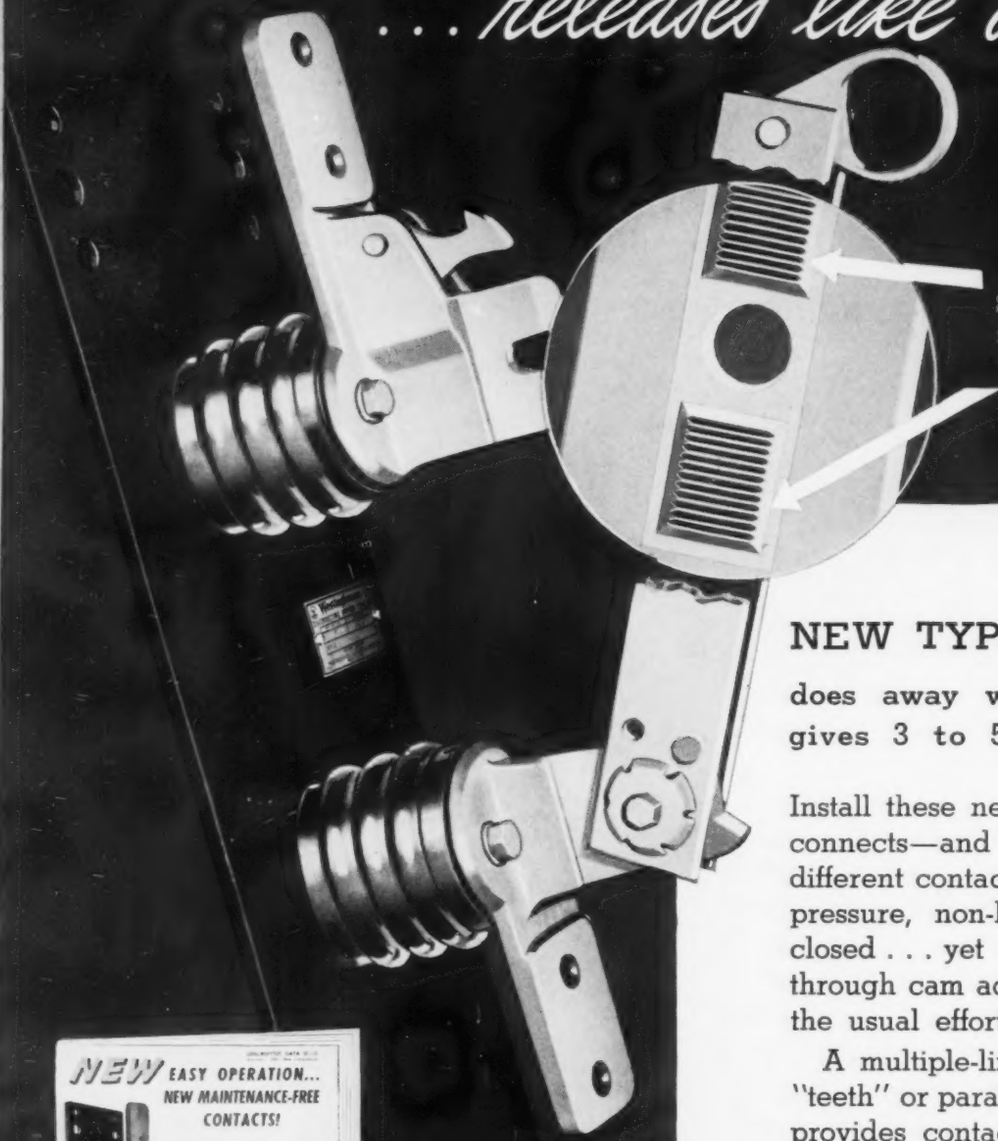

Self-cleaning, self-aligning, multiple-line contact "teeth" of pure silver.

NEW TYPE LC DISCONNECT

does away with contact troubles . . . gives 3 to 5 times easier operation

Install these new, simple, easily-operated disconnects—and forget them! New and wholly different contact design insures positive, high-pressure, non-heating, locked contact when closed . . . yet allows them to be opened, through cam action of the latch, with 1/3 to 1/5 the usual effort required.

A multiple-line pressure area of fine silver "teeth" or parallel ridges on each switch blade provides contacts that are self-cleaning, self-aligning, and self-adjusting. Galling of contacts is prevented and need for maintenance reduced. All single-throw ratings provide 90, 135 and 180 degree position stops and safety lock. Insulators of porcelain or Moldarta to NEMA specifications, or direct mounting on asbestos insulating bases in lower ratings. Ratings of 5,000 volts, 200 to 6,000 amperes, and from 7,500 to 34,000 volts, 400 to 6,000 amperes. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-60384

GET THIS NEW DISCONNECTING SWITCH CATALOG

Just off the press—a 28-page catalog of the new indoor Type LC Disconnecting Switches. Includes dimensions, ratings and selection information. Write for your copy without obligation. Ask for DD 36-116.

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NORGE *The Really Different* WASHER

NORGE *Features* SELL WASHERS

. . . with agitator and drainboards in MATCHING COLORED NORCELAIN the greatest *SPOTLIGHT FEATURE* of the year!

Dealers everywhere report that in the window and on the floor, Norge Agitator and Drainboards in MATCHING COLORED NORCELAIN stop every shopper to discover why this beautiful, luminous blue-green finish is used. This is undoubtedly the greatest eye-catcher, the greatest sales-story-starter of the year—and it has a marvelous story back of it, including the amazing "Silk-stocking Demonstration" to *prove* minimum wash-wear, right on your salesroom floor.

That's the great thing about Norge—every model, from the bottom to the top of the line has a real sales story built right into it in those features that you can SHOW, TALK, DEMONSTRATE, on the floor.

And, with the Norge Pictorial Sales Album, *any* man or woman, with or without experience, can present a graphic and intelligent sales story to any prospect. Six models cover the market (you can "get by" with three), generous finance plans for your customers and for *you*. Investigate the *complete* line of Norge appliances . . . the opportunity for profit from matched unit sales.

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***Indicates feature on every model**

1 Beautiful Norcelain Drainboard in color
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* 3 Steam Seal heat holder
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5 Oversize tubs on several models
* 6 Tubs all-white porcelain, inside and out
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*18 Self-lubricating lifetime bearings
*19 Borg-Warner built Autobuilt Transmission
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*21 Heavy-duty motor, lifetime lubricated.
*22 Motor and transmission mounted in perfect alignment on base plate for smooth running and rigidity
*23 Extra rigid chassis with cross-bracing base plate to prevent weaving. Lifetime built throughout
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*26 Extra sturdy legs, each bolted in four places
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Rush me details of the new 1940 Norge Washer line. No obligation, of course.
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The Greater NORGE *for* 1940

ANNOU

A New Allis-Chalmers Distribution Transformer with . . . NEW EXTRA VALUE FEATURES AT NO EXTRA COST!

Here Are Engineering Advancements that Mean Money-Saving Operation for You!

1. Revolutionary Cadmium-plated 3-Way Terminal Cuts Installation Time . . . Simplifies Wiring Job . . . Minimizes Electrolytic Action on Copper or Aluminum Conductors.

2. New, Durable Steel Tank, Tested Under Pressure . . . Prevents Oil Leakage . . . Assures Long Life.

3. New Spra-bonderizing . . . Plus Triple Coat Automobile Finish . . . Gives Positive 4-Way Rust Protection.

4. Double Conductor Insulation Provides Double Safety Against Winding Failures.

5. Time-proven Core and Coil Construction . . . Designed for Years of Efficient, Service-free Operation.

6. Extra-heavy Porcelain Coordinated Bushings with Liberal Creepage . . . Offer Maximum Reliability Under Fog, Dust, Chemical, or Other Adverse Operating Conditions.

THESE ARE ONLY a few of the great features Allis-Chalmers engineers . . . with a background of over 40 years of building distribution and power transformers for utilities all over the world . . . have made a part of this new Distribution Transformer. We could mention many more.

So before you buy . . . get the whole story on the new Allis-Chalmers Distribution Transformer. Find out how well it fits into your present operating practice . . . how it can save you money . . . how you get ***extra-value*** features at ***no*** extra cost. Call the nearest Allis-Chalmers District office . . . or write Pittsburgh Works Division, Allis-Chalmers Mfg. Company, Pittsburgh, Penn.

ALLIS-CHALMERS DISTRIBUTION

NCING!

SEE HOW THE NEW 3-WAY TERMINAL WORKS! First and second pictures show how simply and easily leads can be brought to the transformer from both top and bottom. But you don't stop there! For the third picture illustrates an ***extra*** advantage you get with no other terminal! If necessary, leads can be brought straight out from the transformer, without making an extra bend in the conductors or complicating the wiring job. Notice how the tightening tool travels in an ***up and down*** direction eliminating the chance for accidental shorts across the secondary terminals. Notice, too, that a standard lineman's wrench is used. No special tools are needed. You don't have to buy extra fittings. Heavy cadmium plating of the 3-Way Terminal makes it possible to be used with ***both*** copper and aluminum conductors with a minimum of electrolytic action.

A-1218

TRANSFORMERS *Cut Operating Costs*

ELECTRA'S HUSBAND

The Biggest Business

FROM the fleeting feline smile on Electra's face as I walked in just a trifle late for dinner, I could sense that she was in good humor. Perhaps she had broken her 1940 run of bad cards and finally won at bridge. On second thought I remembered that Spring racing had started at Tanforan; maybe she had been exercising her uncanny ability to pick "longshots." Both suppositions were wrong.

"I see you fellows finally have a spokesman," she said. "He's a fighter and what's more he has a radio personality. He's that man Willkie and maybe he'll run for president."

"How do you know all this?" I asked, pleasantly surprised, for if Wendell L. Willkie could stimulate feminine imaginations, who could tell what might happen at Philadelphia.

"Didn't you listen to the radio at noon today?"

"Better than that, I went to the Commonwealth Club meeting and heard him speak," I replied. "More people didn't get into the ballroom than did. I was just lucky."

"Gee there must be a lot of people who don't like the New Deal," Electra said slyly.

"You're right, my dear, and not all of them are in the power business," I said. "And Mr. Willkie explained why. Do you remember what he said about Big Government? I was fortunate enough to get a copy of his speech. Listen:

" 'The people of the United States will begin their real recovery from the depression when they resolve to put a curb upon a government grown too great. In the past ten years there was only one major activity in this country which has shown any real expansion; that is the United States government. Government employment has increased nearly 100 per cent; government expenditures have increased nearly 200 per cent, now amounting to over nine billion dollars; government borrowing has increased over 150 per cent. The government has created dozens of commissions and spent millions on buildings to house them. It has enormously added to its power over our lives, and it has largely delegated those powers to Federal commissioners who are not responsible to the people nor to the Congress, but are appointed by the Executive.

" 'Here is a real political boom; here is one activity in which the enterpriser has become both rich and powerful. But all of this has been accomplished at the expense of the people who have paid for it, not only in taxes, but in the losses which their private enterprises have suffered as a result of this government activity.

" 'The most alarming feature of this concentration of power is the creation of omnipotent commissions to exercise it. The new fields of Federal control are administered by small boards or executive commissions, usually appointed by the President and respnsible to no one but the President. They are a part of the executive department. But their function is not executive only. They have two additional functions: one is legislative, the other is judicial. These commissions write the rules which make the laws effective. Then they administer the rules, and when the rules are violated, they sit in judgment on the violators. . . . They become both prosecutor and judge. . . . Under this type of commission regulation we do not have a government of laws. We have a government of men and the conduct of an enterprise may be determined by the caprice of a commission chairman.' "

"I'd like to get my hands in the hair of one commission charman," Electra interrupted heatedly. "He's the fellow who thought up a lot of those silly census questions. Whose business is it how many toilets we have or how many times I might have been married?"

"It's some New Deal theorist's business, my pet," I replied. "They'd rather know things like that than to give some serious consideration as to how to break the logjamb that has piled up five and a half billion dollars in excess bank reserves. Do you remember what Mr. Willkie said would happen if that money could be put to work in business and industry? Maybe I'd better read it to you; here's how it goes:

" 'It has been estimated that industry could provide employment directly for some three million men in operating plant and equipment, and for some six to nine million men in the service industries. On the one hand therefore, there is an enormous amount of idle men and on the other hand there is industry which is very much in need of that money for capital expenditures that would create jobs. This country's depression can be solved whenever we bring these two factors together. If we lived under a dictatorship, the dictator would order the banks to loan the money and the corporations to borrow and expend it. If we lived under the Russian system, both the supply of capital and the industries would be socialized. But both of these systems, as the very basis of their functioning, require the subordination of all personal liberty to the state. The question is, can we cause our great reservoir of free capital to flow into the channels of industry under a democracy? If we can, our democratic system will be preserved.

" 'The answer under our democratic system is for government to get off the back of the people's industry with its unscientific method of taxation; its arbitrary and capricous regulations and controls; its wasteful—extravagant and competitive public expenditures; and its constant attack and harassment of business. And when peace returns in Europe, our Government should re-establish as rapidly as possible, our foreign trade through international trade agreements and through encouragement of our own shipping industry.

" 'If government will but do these things there will be re-created a condition in which the spirit of free economic enterprise can flourish. We will recapture the dynamic quality that used to be this country's outstanding characteristic — the quality which makes men with ideas start new enterprises and men with money eager to finance them—all to the end that there shall be more jobs and more goods for more people and wider markets for the products of our farms; and all of these things can be done without any loss to the social progress we have achieved in this decade—such as the elimination of industrial and financial abuses, the efforts to improve the national well being and individual security and the awakening of the social conscience of the people.' "

"The man certainly thinks straight, doesn't he?" Electra asked. "I wonder if he could be elected?"

"You mean nominated don't you? I wonder too."

CUT OUTAGES WITH THE AUTOMATIC

Service Restorer

AND INCREASE REVENUE

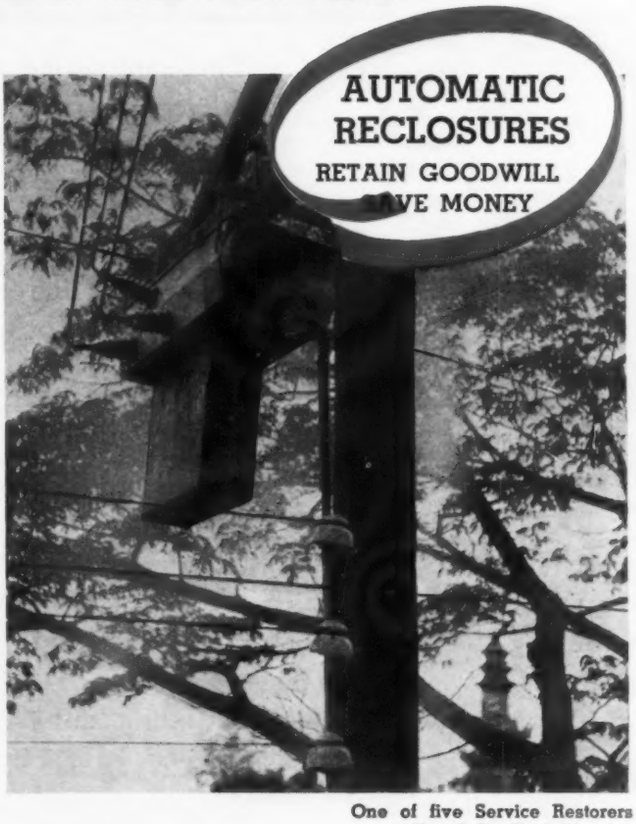
For Rural and Low-Revenue Distribution Lines

Here's the modern way to safeguard public relations and full revenues—

Protect your lines with Pacific Electric Automatic Service Restorers.

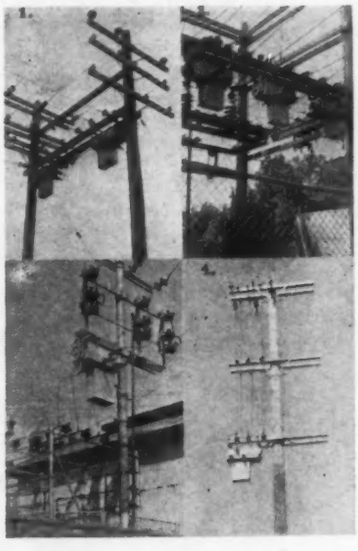
They clear faults instantly through automatic operation. Ordinary line-protection methods may result in long outages and customer complaints. That's doubly costly.

For FULL protection, consider carefully the economy and low maintenance of the Service Restorer. Scores of utilities report reliable operation during severe storms in the protection of distribution feeders and transformer banks. Moreover, it permits the sectionalizing of distribution systems. Send for full details today.



One of five Service Restorers at Bangkok, Thai (Siam)

Installations in
(1) Ohio,
(2) Michigan,
(3) California,
(4) Iowa



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Dependable operation under all weather conditions is what you want. The sound design, well tested by years of field usage, assures reliability.

Service Restorers do not emit dangerous flashes, there are no "hot" parts for men to handle. They may be set to trip at current values close to full-load line current. Get all the money-saving facts.

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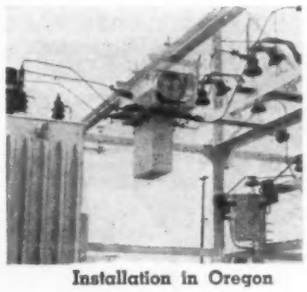

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the GraybaR way!

"Since centralizing our tool purchases with Graybar, we get the right tools for every job without wasting time and money in "trial-and-error"—
Says Construction Superintendent R_____ L_____

(No. 4 of a series of 10-second "quotes" by typical Graybar customers.)

Because of GRAYBAR'S nationwide service in meeting the tool needs of major utilities, you can get a line on the *practical suitability* of specific tools to specific construction or maintenance problems before you buy. The experience of other users... available from your GRAYBAR Man... saves you the time and expense of "trial-and-error."

When you make GRAYBAR your tool headquarters... you can count on an *all-inclusive* source of supply of tools specifically designed for utility service, from a completely equipped line construction truck to splicing clamps or crimping pliers. And the fact that GRAYBAR furnishes the supplies on which these tools are to be used – poles, cable, pole line hardware, insulators, conduit and all the rest – means that GRAYBAR knows what's "fitting" in each particular case. You get the tools that are *right* for the type of equipment your men are working on.

Remember, too, that GRAYBAR can give you prompt service on regular tool items from a branch house in your locality... one of 82 throughout the nation. This means you can save on the investment and space requirements of your own stocks without risk of being caught short. Taken all together, then, doesn't it stand to reason that GRAYBAR is your *logical* source of supply for tools? So why not check with your GRAYBAR Man next time a need arises?

GraybaR QUALITY SINCE 1869 — *Distributed and guaranteed by* GraybaR ELECTRIC COMPANY

Executive Offices: Graybar Building, New York • Branches in 82 principal cities

No need for "trial-and-error" buying on these Graybar-distributed supplies.

LINE CONSTRUCTION BODIES... TRUCKS — available completely equipped, with facilities for earth boring, with pole derricks, winches, etc., as required.

OSHKOSH shovels and spoons, pole supports, peavies, crowbars, and barricades.

KLEIN linemen's tools, including wrenches, climbers, grips, splicing clamps and a full line of pliers.

SALISBURY safety equipment, including linemen's gloves, line coats, rubber blankets, insulator hoods.

DUFF-NORTON pole jacks, cable reel jacks, pipe pushers — a complete range of types and capacities.

UTILITIES sell and promote electrical merchandise to build load in the hope of translating some of the gross revenue from this load into net earnings. The need for new classes of load that will produce the greatest possible increment of net revenue was never more apparent. The reasons are obvious—higher taxes, increased operating expenses and a high ratio of investment to earnings on the one hand and a constantly decreasing average return per kilowatt-hour on the other. Henceforward emphasis must be placed not on load building alone but on *net* building as well. How this can best be accomplished is a problem that impinges upon almost every branch of the industry.

More Net Revenues for the Utilities

Since domestic field is largest revenue classification, promotion and advertising should reach the low users

By V. H. Moon*

It is a business axiom that the surest way to lose business is to quit promoting it. Surely utilities, in common with all other business, will continue to make efforts of some sort to induce their customers to use more of their product, unless the utilities do not wish to retain the business they already have. Utilities may find new and better means of promoting their business, but if they are to remain as permanent, going institutions, they will not quit promoting it. Our busines is not static and our methods of building our business must change with the changing requirements of our industry and the circumstances under which we must operate.

It is certainly important that we promote aggressively in the largest revenue classification—the domestic field. It is important that we use the best means and methods we know of promoting to the domestic class. If there are ways and means of carrying on this work that will accomplish the entire task better without utility merchandising than with it, then utilities should cease merchandising. And the opposite is equally true.

Suppose we examine briefly the present needs and circumstances surrounding our electric utility industry, and particularly the problem in the domestic classification.

FIRST: The utility industry as a whole needs and is entitled to greater net income than it is now receiving. C. W. Kellogg, president of Edison Electric Institute, in a recent talk, made the following statements:

"Electric operating revenue in 1937 was $505,000,000 greater than in 1927, yet so great was the increase during the decade in the cost of operation, taxes, and retirement charges, that net operating income gained only $91,000,000. In the last five-year period, total operating revenue gained $335 million while net operating revenue actually decreased $9,000,000."

Again quoting from Mr. Kellogg's talk:

"Corporate income available for paying a return on the investment grew but $91,000,000 (1927 to 1937) while investment increased about $4,000,000,-

000. This showed but 2.3% on the new money invested during the decade, which is not encouraging if it represents a permanent condtion."

Mr. Kellogg's statements can be accepted at face value and little or no more proof should be needed to indicate that electric utilities need and are entitled to greater net earnings.

SECOND: Table I of the Edison Electric Institute Statistical Bulletin No. 6, issued May 1939, shows that in the year 1938 there were 6,967,000,000 more kilowatt-hours sold to residential customers than in 1932—an increase in sales to residential customers of over 60%. Due to drastic rate reductions during this period, utilities realized only 1.98 cents per kw.-hr. for this large increase.

Sales to small light and power commercial customers increased 6,210,000,000 kw.-hr., or 51%. For this increase, utilties realized 1.75 cents per kw-hr.

Sales to large light and power customers increased 13,935,000,000 kw.-hr., or 45%, and for this increase the utilities realized .513 cents per kw.-hr.

We know that drastic rate reductions during the six-year period we have mentioned are largely responsible for the low average price per kilowatt-hour realized for the increase in sales to residential users in that period. The increase in kilowatt-hour sales bulks large, but it contributes little to the industry's net earnings. It is apparent that utilities now need *net* building activities as bad, or worse, than they need load building activties.

THIRD: Even with the tremendous growth in kilowatt-hour sales to residential customers in the last six years, there are still 55% to 70% of all residential users buying 50 kw.-hr. or less per month. There are 35% to 50% of all residential users buying less than 30 kw.hr. per month.

In general, the best net building activities will develop these low users, since they pay the highest average rates per kilowatt-hour. In other words, selective selling is definitely a requirement of a modern utility sales program.

FOURTH: Competition is not standing still. The competitive gas industry is even more aggressive today than for many years. It was recently stated at a convention of that industry that the ratio of gas ranges sold to electric ranges sold was more favorable to the gas industry this past year than in any previous recent year.

The bottled gas industry has grown tremendously, and while much of this business is done off of our lines, bottled gas is now being sold in small towns and rural territories, which are, or can be served by electricity. As an indica-

*Vice-president in charge of business development, Central Service Corp., Chicago. Based upon an address before the Business Development Section Conference, Northwest Electric Light & Power Assn., Seattle, Feb. 29, 1940.

tion of the growth of this industry, which is to a degree directly competitive with ours, total sales in the United States in 1933 were 38,931,000 gal., while in 1938 sales had reached 165,201,000 gal. Furthermore, in 1927 there were less than 50,000 bottled gas users, while in 1938 this number had increased to well over 500,000.

FIFTH: The manufacturers continue to make technological improvements in appliances, and we can no longer expect kilowatt-hour sales per unit in proportion to a few years ago. Probably, however, the actual sales in number of units will more than make up for lower usage. Let there be no question, however, but what we welcome these improvements as real advancements and as contributions to better living, even though they may add to our task.

SIXTH: Manufacturers also continue to bring out new electrical items which must be introduced to the public, which burden usually has fallen on the shoulders of the utility and is rightfully a part of the utility's job.

It should be apparent from the six points just discussed that the utility today needs more net revenue; that it must engage in net building activities rather than just load building activities; that a large percentage of the utility's residential customers are small users and that this market represents a most promising field for net building activities; that we do have active and aggressive competition to meet; that new models of accepted appliances use less energy than older models and some new items require and should receive promotional support from the utility.

New Business

Commercial men believe that a utility's net earnings can be increased by sound load building activities when net is the objective. Management knows that every dollar of operating savings is reflected immediately in its entirety in net income. Management may believe that the solution to improving utility's net can be reached by operating savings alone. Let's see. Mr. Kellogg says that there is $6 of investment for every dollar of gross utility revenue. According to Statistical Bulletin No. 6 of the Edison Electric Institute, 1938 taxes will take 16 cents of that gross dollar. Other operating expenses will probably take 40 cents; depreciation on the $6 investment surely not less than 14 cents. We have, therefore, before return, 70 cents coming out of this dollar of gross revenue, leaving 30 cents as a return on a $6 investment, which is 5%.

In order to increase this return to 7%, which is needed to attract equity money into the utility business, the 30 cents must be increased to 42 cents. Since taxes do not appear to be going down, and since we have set depreciation at a relatively low figure, the only possible source of savings must be in operating expenses. In order to make a sufficient saving in controllable operating expenses, it would be necessary to reduce operating expenses by more than 30%. Such a tremendous reduction in operating expenses is practically impossible. It would mean a reduction equivalent to 75% of the entire payroll in the case of the average utility.

Net Earnings

Since it seems improbable that an adequate increase in net earnings can be accomplished by savings alone, the only other alternative is to secure new business which contains an attractive amount of net income. In other words, utilities seeking to improve their return will find the best possible means in a combination of operating economies and sound load building activities.

If a commercial manager is going to be allowed to carry on load building activities, he, of necessity, must prove to the management that the activities he proposes will accomplish more in improving the company's net earnings and in solving some of its related problems than would be possible by the money saved if his activities were not carried out. He must be prepared to give to the management of his company value received in the form of increased net earnings, if he expects full support from that management.

Usually opportunities for securing profitable business are available to some extent in the commercial field as well as in the domestic classification. Any complete program would, of course, include activities conducted to secure the profitable business in all classes. However, I would like to confine my remarks to the ways and means of developing profitable business among our domestic customers.

First of all, in order to build a sound program from a net standpoint, it is of utmost importance that we have as complete knowledge as possible of the characteristics of the company's present loads, and also the combined result of present loads and the loads we propose to add through our activities. While there is much that we do not know about the loads we go out to build, a number of valuable studies have been made which throw considerable light on this subject. They are worthy of serious study.

While it must be obvious that a separate analysis and study must be made by each individual company in order to select a program which will fit its own conditions, it is generally true that all companies desire to add loads which will improve their system load factor. Load factors generally have improved since 1932, as is substantiated by the fact that while there has been an increase of 42% in the kilowatt-hours generated in 1938 compared with 1932, the increase in generating capacity over 1932 is only 10%. Still further improvement may be made by careful selling, although utilities must of necessity expect to take on some business which may not be particularly attractive at the moment. In other words, it is always necessary to take some of the lean with the fat.

Improvement in load factor since 1932 is indicated again by the fact that in 1932 there were 4.5 kw.-hr. sold to ultimate customers for every dollar of investment in the electric utility property. In 1938 there were 6.7 kw.-hr. sold for every dollar of investment, and it would seem quite possible that this figure might be raised to 10.

I have mentioned improved load factor at some length as a proper objective for domestic load building because fixed charges on investment constitute such a large part of the costs of rendering service. As previously stated, the average investment in the electric utility business amounts to about $6 for each dollar of gross annual revenue. It is probable then that a load building program will substantially improve the company's net earnings, if the additional investment necessary to serve the load being secured is less per dollar of gross revenue secured from the new load than the present average ratio of $6 to $1.

Fixed Charges

Suppose, for example, that we assume that the new load we are adding will result in an additional investment of only $3 for each dollar of additional gross revenue. It is obvious then that only half as much out of each dollar of new gross revenue must go for fixed charges as would have been the case had it required a $6 additional investment.

We are sometimes inclined to the belief that the higher the rate received per kilowatt-hour, the more we can carry to net from each dollar of gross revenue. This is not always the case. For example, suppose we find it necessary to invest $5 for each dollar of new revenue of a certain kind. Assuming taxes at 2%, depreciation at 3%, and return at 7%, we have a total of 12% in fixed charges. This amounts to 60

cents in fixed charges alone, and leaves 40 cents for operating expenses other than taxes.

If the kilowatt-hours resulting from this load were sold at 5 cents per kw.-hr., we would furnish 20 kw.-hr. for $1. Suppose that it cost the utility one cent per kw.-hr. for all expenses other than those fixed charges mentioned. This would amount to 20 cents, which when added to the 60 cents of fixed charges would leave 20 cents to be taken into net earnings (over 7% return) out of the sale of $1 worth of kilowatt-hours at 5 cents each.

Now, suppose that we find we can develop certain other loads with an investment of only $3 for each dollar of gross revenue, but we must sell these kilowatt-hours at 3 cents. Fixed charges on our new investment will be 12% of $3, or 36 cents out of the dollar. If we sell these kilowatt-hours at 3 cents, we will furnish 33 kw.-hr. to our customer for $1.00. If they cost us one cent each in additional expense, we have a total cost of 33 cents plus 36 cents, or 69 cents, and we have 31 cents to take into net instead of 20 cents as in the previous example.

The example just given will illustrate that we must not look entirely at the rate which we are to receive as a result of selective selling, but must look even more closely at the character of the load we are going to build.

Load Characteristics

I mentioned before that there was much that we did not know about the characteristics of certain loads we were trying to build. I believe this is particularly true of the appliance load. I doubt if anyone in our industry has reliable information on the diversity or the demand of many of the well-known small appliances. Included with such small appliances can be such items as the washer, the vacuum cleaner, the ironing machine, the sun lamp and a host of others. Because of relatively long hours of use, additional lighting loads to the smaller residence apparently offer most companies an excellent means of adding net income.

While I have every reason to believe that this is so, I doubt if anyone knows the average revenue received or kilowatt-hours sold by his company per kilowatt of home lighting load connected. Possibly if we knew more about the diversity of our home lighting load, more about the burning hours, particularly of those lighting loads in the active rooms, more about the effect of such additional loads on our system load curves, we would be even more enthusiastic about home lighting load than we are today.

Probably, as most utilities have long recognized, the tops in desirable domestic load is the electric refrigerator. This is particularly true net-wise when sold to a customer still in the high rate brackets.

The electric range is considered by some utility men as constituting an unprofitable load. This can well be true under certain circumstances, but under average conditions the combination load of the range and water heater will also contribute to increased net after fixed charges on the total investment necessary to serve the combination load.

Higher Return

Unnecessarily low cooking rates and unjustified selling costs, including free wiring and dealer subsidies, have done more to turn management away from range promotion than the character of the load itself. When sold at fair rates, in proper combination both numerically and geographically with low wattage off-peak water heating, the resulting combined load will pay the average utility a far higher return on the investment necessary to serve it than the present day overall average of the industry.

Naturally the same appliance creating the same loads using 5-cent electricity will furnish more net than if using 2-cent electricity; therefore, the need for selective selling, if we are to conduct net building campaigns instead of just load building campaigns. By its very nature, selective selling and selling to low use customers results in smaller individual sales, smaller increments of load added with each sale, and higher selling costs per dollar of E.A.R.

Sales of load building appliances and lighting in such a selective manner is hardly the profit-making merchandising venture that would attract the ordinary dealer. If this selective load building and net building job is to be done, it seems obvious that the utility itself must do it. It must be apparent, also, that this type of load cannot be built without the sale of utilizing devices by someone. You can well imagine that it would be terrifically expensive for utilities to absorb all of the expense of the endless solicitation which such selective selling entails without any of the offsetting gross profit of the merchandise sales which results. (And it would be awkward for the customer as well as expensive for the utility.) As far as I can see, therefore, the most practicable and the most economical way of building net in the domestic field is for utility companies themselves to engage aggressively in thorough selective selling of domestic devices and lighting.

When we have secured a fair measure of our cost of building net, we must also make equally earnest efforts to secure proper and accurate information on gross and net revenue we have added by the activities, through continued analysis and field checks.

Someone will probably say, "Well, what about the dealer?" All of us know that this kind of a selling job is not the dealer's job. He cannot afford to do it, nor can he be expected to do it. Neither can he afford to promote new and unaccepted items. Both are primarily jobs for the utility, not for the dealer. We know that utility promotion of most items precedes market development to a point where merchandise sales come easily enough to make their promotion profitable to a straight merchandiser. This idea can be sold to thinking dealers, if at the same time the utility will work out a cooperative program with the dealer that really works and that he can better afford to be in on than to go along by himself. It is in the dealer's interest for utilities to do this promotional job, and of even greater importance, it is in the public interest that we do both jobs, since greater use has always meant lower rates.

Good Will Value

Another item which should be considered by any utility in planning its domestic load building program, is the possible good-will value of the thousands of contacts that can be made with a large, aggressive organization in the field, whose objective is increased kilowatt-hour sales to those 50 to 70% of customers using less than 50 kw.-hr. per month. Such a force could hardly be kept in the field wtihout merchandise of some kind to sell.

It would, of course, be senseless to prescribe the same procedure for all companies. Situations do differ and do require different treatment, and good analyses of those conditions, taking advantage of all information that can be secured from the various departments within the company, will indicate proper procedure.

Summing up, utilities need and deserve more net revenues. The domestic field still offers a fertile market for more service which can be sold at a profit. It is my belief that the best method will entail the sale of merchandise by the utility, particularly to selected groups of customers. We must know more about our loads, more about our actual costs. We must develop confidence in the E.A.R. we claim from our activities by check and double check. We must relate these costs to the actual gross and net revenue we build, and we must prove to the "boss" that the activities we propose will help increase the company's net earnings.

Mrs. Blanche Harris, who has taught in the North Fork School District for 13 years, stands on the porch of this little red schoolhouse gone modern. It's complete with indirect lighting, an all-electric kitchen and Wesix air heaters

The Little Old Red Schoolhouse Goes Modern

BACK in the little red schoolhouse days, the boys and girls who usually walked to this pillar and landmark in the history of American education, read their books and scrawled their lessons in a light that at times caused their teacher to "turn on" smelly kerosene lamps, or dismiss school till natural daylight came again to "light the way."

Today in rural districts, conditions in the little red schoolhouses that still exist, from a lighting standpoint, are just as bad as those in early days. Lights, though they are electricity, are poor. Glare tends to ruin the eyesight of growing children, and shadows dim the atmosphere in which young minds and young eyes are striving to get an education.

A notable example and exception is the North Fork School, located at Caribou, Plumas County, California, at an elevation of approximately 3000 ft. The school site is in a deep canyon with only a few hours of direct sunlight each day, during the winter months; hence adequate lighting and heating is of primary importance. Early last year the school board decided to erect a new school of a modern type which would overcome this disadvantage.

This community is more or less isolated from any large town and it was therefore decided to build a school that would give the pupils all the advantages possible under the circumstances. North Fork School was designed by Chas. Dean, Sacramento architect, and has been heartily indorsed by the County Superintendent of Schools, Plumas County. General design will be suggested in future schools to be erected in that county.

The school has two stories with the main classroom being located on the upper floor and a playroom or gymnasium on the lower floor. This permits the pupils to stay inside in inclement weather during recess and noon hour

Project-work room (left) opening off main classroom shows Westinghouse Magnalux lighting fixture and 3 KW Wesix flush heater with built-in thermostat. Closeup of blackboard reveals photo-electric cell for controlling lighting

These inside glimpses of the classroom show ideal lighting conditions under which schoolchildren in this district are taught. Door in right picture opens into a kitchen equipped with an electric range and a 30-gallon water heater. Even the clock is electric

and have proper physical exercise.

The building is of frame construction with four inches of rock wool insulation in the walls and ceiling. The ceiling of the top floor is also covered with one-half inch celotex board. Inside walls are of natural finish with "knotty pine" boards. In addition to the classroom and playroom there is a project-work room and library room opening off the main classroom. On the upper floor is a modern kitchen including electric range and water heater. Adjacent to the playroom is a shower bath for the convenience of the pupils.

The main classroom is lighted with six 300- 500-watt Westinghouse Magnalux indirect units. Minimum illumination is 30 ft.-candles on the desk nearest the inside wall. An inner row of lighting units is controlled with a General Electric light control unit using a photo-electric cell and relay. This has been adjusted automatically to turn on the inside row of lighting units when illumination drops to 30 ft.-candles. A playroom is illuminated with three 500-watt recessed X-ray reflectors. Flush units permit the playing of volley ball or hand ball without interference of lighting units. Halls and stairways are illuminated with Daybrite standard flush panel-lites.

Temperatures are as low as ten degrees F. in the colder winter months and have been known to reach the zero point. On account of this condition heaters were necessarily sized accordingly. The connected load in heating is 37 kw. Wesix flush type heaters with thermostatic controls were used.

In the main classroom and playroom heaters were equipped with baffles to lessen the amount of radiant heat. In addition to the air heaters the school is equipped with a 10-kw. electric range and 3-kw., 30-gal. electric water heater. Service was established Nov. 27th, 1939, and, from the kilowatt hour consumption since that time computed on the P.G. & E.'s H-1 rate, indications are that the cost of heating will be less than $100 per year.

In designing this building the school board was desirous of building the most modern school possible. It is expected this building will be in use for many years to come and will provide the pupils of this school district with all the advantages possible within a more or less isolated community. The need for adequate lighting was recognized particularly for children who were forced to do difficult seeing tasks. After a careful consideration of the various methods of heating, electric heat was selected, due to the flexibility, convenience and low cost of operation when all factors were considered.

Downstairs playroom is shown with 500-watt recessed X-Ray reflectors and 6 KW flush Wesix heater in left lower wall. A model of the original schoolhouse has been built to scale on work bench at left. Library (above right) is 8 ft. x 10 and adjoins classroom

P. F. As Applied to Fluorescent

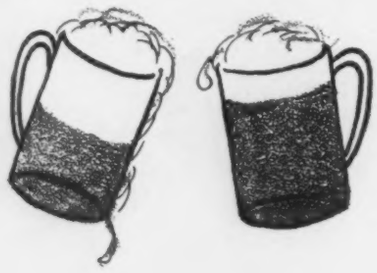
By C. R. Benson*

What power factor is and why fluorescent lighting requires correction is explained simply and fully

CERTAINLY fluorescent lighting has captivated public fancy and has opened new vistas of market development for the whole electrical industry. However, this new light source has brought with it concurrent problems, not the least of which is the matter of power factor correction. It is extremely difficult for the average consumer to visualize what the term "power factor" means, or what the reason is for requiring a correction in power factor on fluorescent lighting circuits. And unfortunately there are many people in the industry who are engaged in the sale or development of fluorescent lighting whose knowledge of power factor is equally hazy.

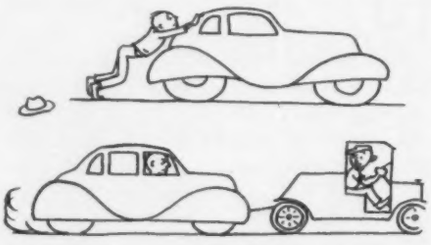
Explaining what power factor is and why it should be corrected need not on all occasions bristle with technology. All electrical devices require current to operate them; in some all of the current is useful, i.e., it performs useful work. In others two kinds of current are necessary—useful and wattless or non-useful. In simplest electrical terms power factor is expresed as the ratio between useful current and total current or between true power and apparent power. A number of simple analogies may be found in various phases of everyday living which compare to this situation.

The oldest comparison is a glass of beer. When the bartender draws a glass of beer and you pay for it, you pay for beer plus foam. If the glass is half full of beer and the rest is foam, you might say that the power factor of the beer was 50%, and you are only getting half as much beer as paid for.



Another comparison might be an automobile that has broken down, and you contract to tow that machine at so much per mile. If, when you start to tow the machine, the occupant puts on the brakes so that you have to pull twice as hard, you do not get paid any more, but you work twice as hard. The amount the brake is on, we can say, determines the power factor, or how hard you must pull. The utility is in this same position. For the consumer with a 50% power factor load they must supply twice the normal service with the same pay.

Or, still another example might be the case of pushing an auto. If you can push on the machine in a convenient location, you can accomplish some good, but try to move the machine by pushing on the side above a level with your head. The amount of actual work done is the same in both cases, but the energy expended is a great deal more in one case than in the other.



Still another analogy might be made to an oil company which decided that every customer was entitled to one quart of oil for every ten gallons of gasoline purchased. The gasoline actually supplies power to the auto, but the oil is essential for satisfactory operation. The man with the new car would be satisfied with such an arrangement. He could accumulate his oil checks and every thousand miles have enough for a complete change of oil. But what about the man with the old "jalopy?" One quart of oil per ten gallons of gas is not enough for him. The amount of oil required may, in a way, be said to determine the power factor of his car. This man can do one of two things. He can either buy more oil, or he can have his car repaired (improve the power factor) so that one quart of oil per ten gallons of gas is sufficient.

The man with the old car is really paying more for his gasoline when he purchases additional oil. He can overcome this by spending money on his car for the necessary repairs; that is, he can bring the power factor of his car up to unity or at least close to that figure.

Going back to the original definition, we found that

$$\text{Power Factor} = \frac{\text{True Power}}{\text{Apparent Power}} = \frac{\text{Useful Current}}{\text{Total Current}}$$

Resistance loads such as lamps, heaters, ovens, etc., may be considered as unity power factor loads. That is, the watts required as read by a wattmeter (true power) would be equal to the product of the voltage and current (apparent power). A 600-watt Mazda lamp used on a 120-volt circuit would require 5 amp. o fcurrent (5 amp. times 120 volts = 600 watts).

Now assume it was desired to use this lamp on a 240-volt circuit without a transformer. It would be necessary to put some voltage reducing device in series with the lamp if it is not to burn out. If a resistance is put in series, the circuit would be as shown in Fig. 1.

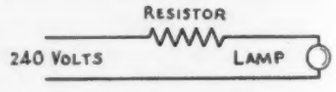


Fig. 1

With the correct value of resistance, the current would still be 5 amp., but look at what has happened to the energy consumed: 5 amp. times 240 volts = 1,200 watts. The additional 600 watts is dissipated as heat by the series resistance. Not very economical you say, because for 600 watts of light you pay for 1,200 watts of energy.

Assume, instead of a resistor, you used a choke or reactor, and that its losses were so small as to be negligible. The circuit then has the characteristics of Fig. 2.

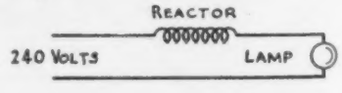


Fig. 2

The reactor is chosen so that the lamp still receives its required 5 amperes at 120 volts and the energy consumed is still 600 watts.

* Transformer Division, General Electric Co., Emeryville, Calif.

But what about the power company? It is supplying 5 amperes at 240 volts, or 1,200 volt-amperes. This 1,200 volt-amperes is the apparent power. The 600 watts is the true power and we come back to the definition of power factor:

$$\text{P.F.} = \frac{\text{True Power}}{\text{Apparent Power}} = \frac{600}{1200} = 0.5 \text{ or } 50\%$$

The power company is then required to have available equipment twice as large to serve a 50% P. F. load as is necessary to serve a unity power factor load. The utilities' lighting rates are based on unity power factor loads. Certainly it is discriminatory for two consumers to pay the same rate, and for one to require twice as much equipment as the other. So some utilities require that the power factors of lighting loads be improved to 90% or better.

The relationship between useful current and total current is not an arithmetical one. It is a vectorial relationship, and can best be shown by a right-angle triangle. In the example above, the total current was 5 amp. and the working current was only half this, or 2½ amp. Fig. 3 shows the vectorial relationship.

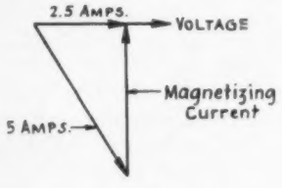


Fig. 3

Power factor is improved by the use of shunt capacitors. Let us assume that a suitable capacitor was applied to the circuit discussed to bring the power factor to 90%. The circuit would be as in Fig. 4 and the vector diagram as

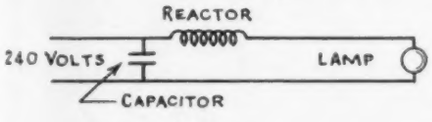


Fig. 4

in Fig. 5. If enough capacity was added to bring the power factor to unity, the current would be only 2½ amp.

On alternating current circuits electrical equipment, such as induction motors, transformers, electro-magnets, reactors, etc., require additional current, over and above the useful current, to magnetize the iron in order that they may operate. A capacitor requires a current that is exactly opposite in direction to the magnetizing current. The capacitor may then be thought of as supplying some or all of the magnetizing current, depending on the rating of the capacitor. The result is that the lines and equipment up to the point of application of the capacitor are relieved of some of the magnetizing current.

The capacitor current subtracts directly from the magnetizing current. The result is a low net magnetizing current, which when added vectorially as shown to the useful current, gives a final total current of only 2.78 amperes, as compared with the original 5 amperes. If enough capacity was added to bring the power factor to unity, the final total current would be only 2½ amperes.

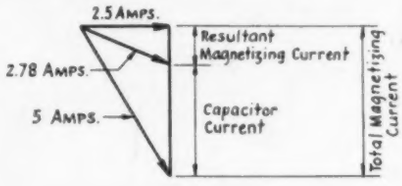


Fig. 5

Fluorescent lamps and their auxiliaries or ballasts are represented in general by Fig. 2, except that the reactor has some losses. The overall power factor of the fluorescent lamp and its ballast unit is between 50 and 60%. The non-energy current is used to magnetize the iron in the reactor or ballast.

As shown previously, 50% P. F. circuit requires the utility to have twice the equipment available to serve it as does a load of unity power factor. In order to make the lighting rates equitable to all lighting consumers, some utilities have requested that all fluorescent lighting circuits be corrected to a power factor of 90% or better.

At first thought, this requirement might seem expensive from the consumer's standpoint, but let's look at the facts. Why are lighting customers using fluorescent lamps and what are the benefits to them? There are a number of answers to this, but among the most important are, better light, lower cost lighting, and the novelty. Better lighting is obtained because of the approach to natural daylight. Lower cost lighting is obtained because of the greater efficiency, especially when colored lighting and lighting effects are desired.

Just how expensive is the requirement that the power factor of fluorescent lighting be improved to 90%? In general, it may be said that power factor correction will cost 1 to 10% over the installed cost without power factor correction.* In many cases this additional cost can be offset by savings in losses, wire sizes, number of circuits, etc. For example, if an installation is to be made requiring 75 or 80, 30 watt lamps, the proper use of capacitor would allow all** the lamps to be put on one 20 ampere circuit, requiring only one set of disconnecting switches, fuses, etc., as well as a saving in cable and installation expense.

On installations such as the modernization of the lighting in an old building, the judicious use of capacitors would enable almost twice the number of fluorescent lamps on a given circuit without rewiring. Such a case would represent a very great saving, and pay for the additional cost of the capacitors many times.

* In general the use of TULAMP high power factor ballasts is the most economical.

** Subject to modification by local city electrical inspectors' rulings on allowable loads, per circuit of fluorescent lighting.

Lighting Award

In behalf of the Magnin store, Los Angeles, Grover A. Magnin, vice-president of I. Magnin & Co., last month accepted the hand-illuminated parchment award from B. A. Selten, president of the Lighting Fixture Industries of Southern California, for the best lighting installation of 1939. The ceremony took place in Magnin's office in the Wilshire Boulevard store.

When the store was being planned a year ago, Magnin decided to use fixtures rather than hidden or indirect lighting as only with fixtures, he believed, could the warmth and harmony between the lighting and the general decorative scheme be achieved. So successfully was this carried out that the use of fixtures in the store has, says Selten, been a great impetus for the lighting fixture industry.

MAGNIN SELTEN

All the lighting fixtures, both for overhead and showcase lights, were designed and executed by Los Angeles firms under the direct guidance of Magnin.

Clocks

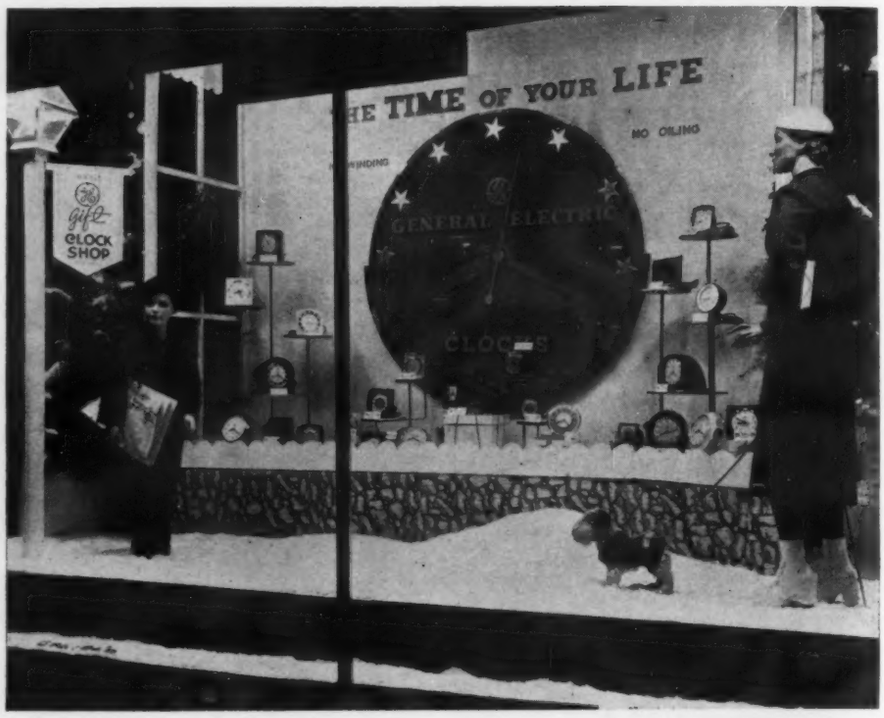
G-E window display contest won by Pasadena department store

First prize in a national dealers' window display contest sponsored by the General Electric clock section, Bridgeport, Conn., was won by the Herman R. Hertel Co., Pasadena, Calif., department store. Before the Christmas season, a "jig-saw" window display of 86 cut-out pieces was made available to authorized G-E dealers throughout the United States. A striking and sales-producing window was to be built with this material, and substantial cash awards were given for the three best displays.

P. K. Howell, display manager for the Hertel store, arranged the prize winning window. Among the displays given honorable mention were: Broadway Department Store, Los Angeles, Calif.; Cheyenne Light, Fuel and Power Co., Cheyenne, Wyo.; and Liberty House Department Store, Honolulu.

The display was loaned to dealers without background. The 86 pieces, of wood and fibre, included 17 letters spelling "The Time of your Life," 21 letters and a monogram spelling "General Electric G-E Clocks," four sections spelling "self starting," 12 silver stars, three clock hands, and 29 letters spelling "no winding, no oiling, no regulating." The flexible material could be arranged in any window or wall space, and was easily installed with common pins or brads.

The Hertel blue-ribbon display included a bright red clock dial against a blue board background. Live potted pine trees, dusted with cotton and untoasted corn flakes, flanked the window. In the foreground a newsboy carried a local daily newspaper with a G-E headline. The dog and girl, dressed for winter, added appeal and directed visual attention to the clocks.



Winning electric clock display in national contest conducted by General Electric Co.

Retail League

General Electric merchandise division plans organization

Plans for organizing every retail salesman of General Electric home appliances into a single cohesive unit—the Retail Development League—for purposes of training and ultimately greater profit to every link in the distribution chain have just been announced by G-E executives at Bridgeport, Conn., headquarters of the company's appliance and merchandise department. The disclosure of the plan, considered by its sponsors the most ambitious attempt ever made within the confines of the electrical industry to solve the increasing complex problems of appliance merchandising, came with the departure of several groups of sales officials who are to start the organization on its first steps in key sections of the country.

The plan of the Retail Development League, while national in scope, has been tested in every detail in certain distributor territories, declares C. M. Snyder, G-E appliance assistant manager. Years of experience in sales training have been drawn upon in the scheme's preparation, and General Electric is estimating that three years of effort will be necessary before every step will be realized.

Jean DeJen, in charge of the company's retail development section, has been responsible for working out the details of the league's organization, and as its president will actively direct the program. On its governing board are C. M. Snyder, assistant manager of the G-E appliance and merchandise department, as chairman, and representative of every appliance product line and merchandising activity. Headquarters will be in Bridgeport, and its 12 district offices will coincide with the company's appliance sales districts. All appliance distributors who accept membership in the league and agree to conform to its requirements will be chartered as "grand chapters," and retail chapters—the backbone of the plan—will be organized in each distributor's territory, the number depending upon the local requirements. These chapters will have meeting rooms, officers, dues, planned programs, and many of the characteristics of a national social or fraternal organization. Each chapter, consisting of a minimum membership of ten retailers or retail salesmen of G-E appliances, is to be located within easy driving distance of its members. In many instances, special utility or department store chapters will be formed to meet special circumstances.

Salt Lake Area Under Way

Charters and the conducting of first classes in the Salt Lake area are being handled by Bob Brogan, Frank McNelless and D. L. Moore representing General Electric Co. and Jacob A. Kahn and Will O. Smith representing the G-E Supply Co. First charter, No. 59, was issued at Cedar City, Utah. Officers elected at the organization's first meeting were Harvey E. Luce, J. Bryner and L. D. Watson; president, vice-president and secretary, respectively. The Salt Lake City Chapter, No. 60, will have as its officers, Paul Huish, president; Ken E. Smith, vice-president; Fred Peterson, secretary-treasurer and Ross Ramsey, honorary president.

Additional charters will be granted to organizations in Twin Falls, Idaho, No. 61; Boise, No. 62; and Idaho Falls, No. 63. Six meetings will be held during 1940 with the tentative schedule calling for one each in March, April, May and June. The other two meetings will be held at dates to be announced later.

New Drive

Washington Water Power conducts "Better Living" campaign

Violets, June brides, fire crackers and fish . . . all these and more await salesmen of the Washington Water Power Co., in the six months' sales campaign now being planned to promote the sale of ranges and water heaters, according to Frank Tool, residential sales manager with the utility. This campaign, to be known as "Better Living," extends from March 1 to Sept. 1, and will be the company's major sales activity of the year.

Six months' activities will award as over-all prizes the Kinsey M. Robinson Range Trophy, presented by the president of the utility, and the J. E. E. Royer Water Heater Trophy, presented by the vice-president and general manager. Both of these trophies will be practical silver pieces, going to the divisions with the highest percentage over quota. Each trophy will be circulated and inscribed to winners of each month's campaign period.

Fun, excitement, prizes will be featured during each month when campaigns will tie-in with current activities. March becomes the "Violet" period, with a surprise package going to all winning salesmen from General Sales Manager R. B. McElroy, who is conceded to be the father of violets. In April comes "Feather Your Nest," whose novel climax is to feature the low division manager's meeting the high division manager at the train station with a band, and a newspaper reporter, his entertaining the high manager, while he, himself, learns the secret of the visitor's success.

In May the "Fisherman's Derby" will be topped off with an unusual fish dinner, dealers included. "Winning the Bride" comes in June, and includes a life-size charivari. Something 'Too Hot to Handle' climaxes the July period of "Fire Crackers," and the whole campaign ends on the August special, "Bathing Beauty Contest," for men only, whose final day will see a special sales manager's revue.

Each month prior to the period's campaign details, including quotas, salesmen's prizes and models of appliances to be featured will be sent out to the division offices of the utility over the territory.

"We expect to sell 3,600 ranges and 3,000 water heaters during 1940," Tool declared. "During 1939, company and dealer sales for electric water heaters amounted to 2,432 and for electric range 2,610."

Cinema

Hotpoint Hollywood show meets with enthusiastic response

Hotpoint's full length feature motion picture, "Blame It on Love," is sweeping the country. This Hollywood movie, featuring well-known stars, is providing an unequalled opportunity to present Hotpoint appliances to large groups, in a dramatic appealing manner.

"Blame It on Love" is the story of Terry Arden (Joan Marsh), who is deeply in love with Jeff Wadsworth (John King). Jeff's mother is bitterly opposed to her son marrying a "swing" singer, which is Terry's means of livelihood, but the two elope anyway. Terry tries hard to make a real home out of their apartment, but it is soon evident that she is about the world's worst housekeeper.

Complications result, and Terry leaves Jeff to become a singer on a new radio program, "Modern Home of the Air," which features the Hotpoint Electric Kitchen. Here she meets a home economist and an electrician (see above and below) who teach her the fine art of electric cooking. Terry soon becomes quite the homemaker, and the picture ends happily, thanks to Hotpoint.

Little Woman in Business

By Ethel Burke Wheat

Did you ever have an experience like this? I was considering the purchase of a new electric refrigerator, and found that the particular make in which I was interested was sold by the John Doe Electric Shop. So one afternoon, I strolled into this shop to look over the new models. A pleasant-faced woman was sitting in a comfortable chair, engrossed in a popular magazine. Obviously reluctant to break the thread of her story, she arose somewhat slowly as I made my way toward the refrigerator display. In answer to my inquiry concerning the new models, she replied, "There they are. Just look them over all you want to. I'm sorry that I don't know very much about them, but I'm just tending the shop, while my husband is out on an emergency call."

It wasn't very long after this incident that my husband decided to leave his position with a power company to enter the electrical contracting and merchandising field. We were young and starting out "on a shoe string." More than half of our capital was borrowed. We purchased a business which had run down but which, with the optimism of youth, we believed we could build up into a profitable business.

It was necessary for us to be very careful and to watch all the corners. In order to cut down overhead expense, my husband suggested that I might be able to help out in the store during my spare time. Instantly there flashed before my mind the picture of the woman with the magazine. I didn't know a thing about the electrical business, but I thought I knew one thing NOT to do.

I resolved to make myself thoroughly familiar with every piece of equipment in the store, not only as to operation and price but as to talking points, labor saving qualities, convenience, etc. My best instructors were the salesmen from the wholesale houses, and my text books the literature from the manufacturers.

Then one day, just as I was beginning to feel a sense of proficiency, and had just finished an eloquent discourse on the advantages of a certain electric range, the customer inquired, "I suppose that you use this type of range in your own home?"

Was my face red? I did not have an electric range in my home. As I have said, we were operating "on a shoe string." We were economizing by using the same old equipment with which we had started housekeeping.

This taught me a second most valuable lesson. To be a convincing salesman, one should speak from experience. It is not enough to desire to sell an article, you yourself must "be sold on it." Therefore, although we could ill afford to do so, we equipped our home with the merchandise we were selling. In the end it proved a wise investment. I was able to give customers pointers and suggestions which were not found in trade literature, and my words carried greater weight because I spoke from experience.

Another way in which the "little woman" can be a help in this type of business is along the financial side, if she is a good household budgeteer. As our business increased, my husband's time became more and more occupied by the contracting part. About this side of the business I knew nothing, but I could watch our collections and our bills. I had always run our household on a budget and I felt that somewhat the same principles should be applied to a business if there was to be anything left over at the end of the month. So I started to watch the corners.

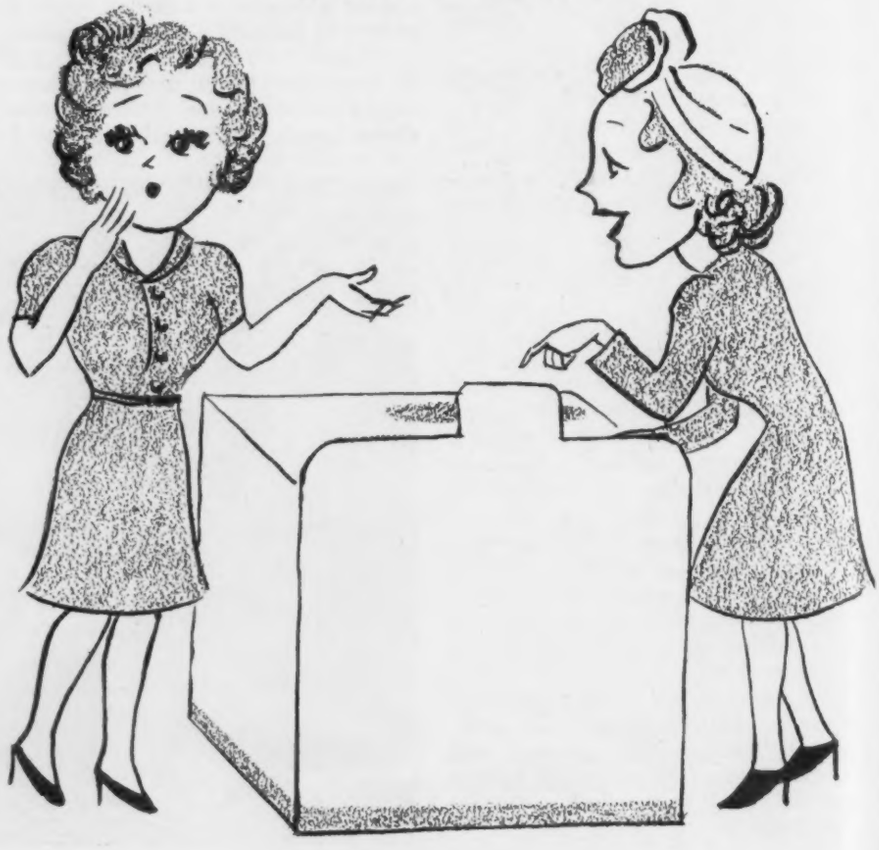
One of the easiest and quickest forms of profit, I discovered, was the cash discount offered by jobbers for the payment of bills before the tenth of the month. Alas, this required cash and in our early days cash was a scarce commodity. "But other people owe us," I said to myself. "Why shouldn't they pay us promptly so that we can pay our bills promptly?" By concentrating on collections it was usually possible to take these discounts. At times we ever borrowed from the bank to do so, but we found it a paying investment in more ways than one, for it created that great asset, a high rating with our creditors.

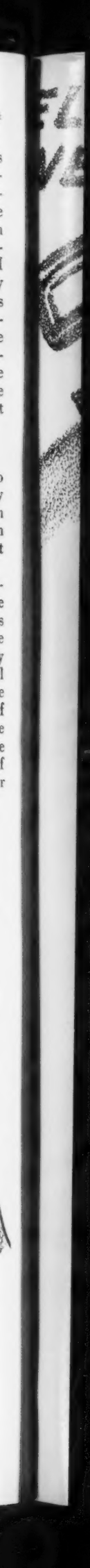
Information Source

While my husband has continued to do the actual buying, he has had to rely more and more upon my information as to the type of merchandise which sold best, what was profitable and what was not.

There is a thrill in seeing your business grow and in realizing that you have a part in it. The dealer's wife who tends shop with her eyes glued to a magazine is losing a lot of opportunities, not only for financial reward but for personal enjoyment, because she is missing the fascination of selling and the joy of accomplishment. In other words, the "little woman" can be an asset to the business and in addition obtain a lot of enjoyment and satisfaction out of it for herself.

I suppose you use one of these, too?





PRINT IN BINDING

ELECTRICAL WEST

SALES GUIDE

Are you asking yourself—

"WHERE DO I COME OUT?"

Down went refrigerator prices. Up went volume, on the low price leaders. But your real margin for commissions and profits remains in selling the better models, the fully equipped and higher priced lines. That's where it pays you to put your best effort.

Realize that you have twice as much to sell today at half the cost of a few years ago. Make this surprising fact work for you, not only in the sale of refrigerators to new users but to capture some of the big replacement market that is ripe for newer, more efficient models.

Refrigerator business can still be cream trade when you

1. **Play up the extra value available today at lower cost.**
2. **Make this step your sale up to the models that have the most to offer in value and design.**
3. **Sell larger capacity refrigerators to replace the inadequate first models they bought originally.**
4. **Use the lower price models to get down into a group you couldn't reach before, those of low buying capacity. It may be the skim milk but it supports the cream.**

You'll come out ahead in 1940 that way. See the last page for a list of the straight advantages and plus values.

TWICE THE VALUE AT HALF THE COST

REFRIGERATORS

APRIL 1940

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OH, BY THE WAY—

reopeners for the prospect who--

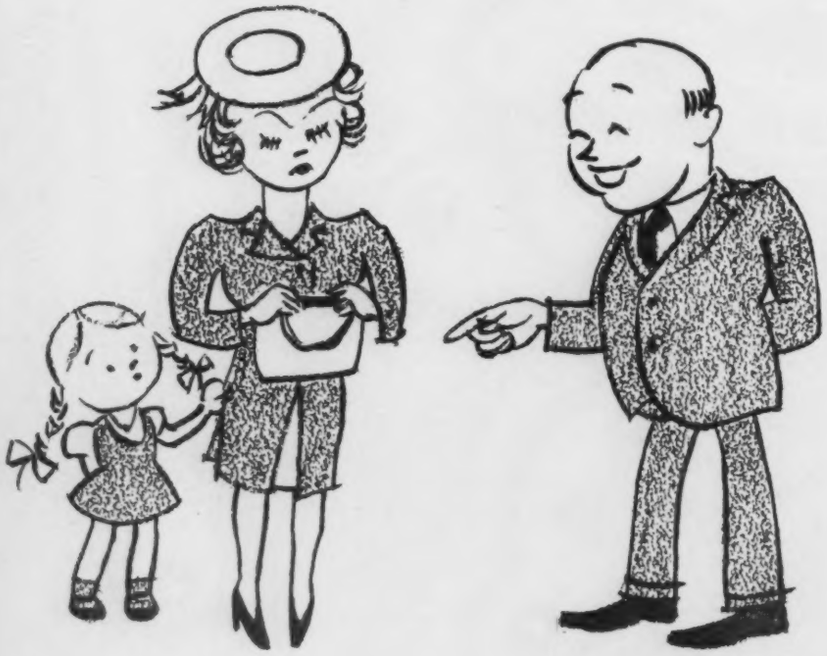
1. Is short of money

2. Hasn't enough room

1. New prices give you a chance to go back to a number of former prospects whose finances were such that they could not buy the higher priced models. If they do not warrant a costly solicitation, just use the telephone or write them a post card—a personal one—inviting them to come in and talk it over again. Say something like this:

"By the way, there's a new chance open now for you to enjoy a money saving electric refrigerator. Have you heard of the new prices and terms? You were in some time ago and we talked about a refrigerator. I believe the conditions are changed now and that you can really take advantage of them. Won't you drop in. Let's talk it over."

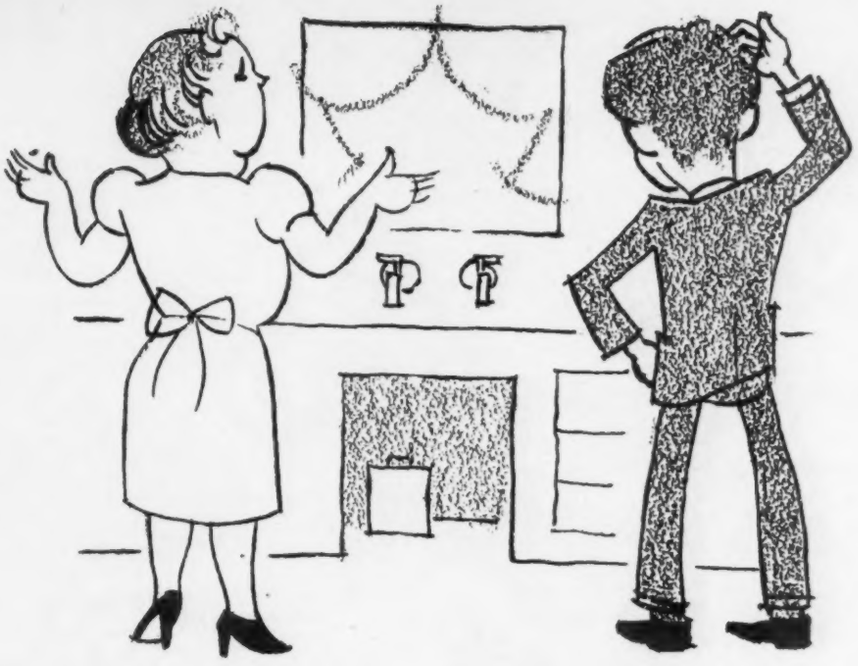
The same approach can be used on a house call, or even on a cold canvass. You have something new for them to consider.



Then for this kind of prospect use the **economy** and "pay for itself" advantages listed on the last page of this Guide.

Bolster these with the food protection appeal . This is basic and you may be surprized but it still is the strongest appeal. You are the only one to whom it is old. But **you** aren't **buying** the refrigerator —you are **selling** it. It **is** new to the buyers.

SUGGESTED BY



2. Space to put a new and larger refrigerator may be a real stumbling block. Sometimes it definitely limits the size of model you can sell. In other cases it prevents replacement with a larger size, even where needed. But don't give up until you exhaust the possibilities. They may be better than you suspect. It is worth trying this:

"Yes, I can appreciate that finding room is a very real problem. But, by the way, there are often things that can be done, either in selecting a special model or rearranging things. Let me come out and make a survey, if you don't mind. We have had a good deal of experience in such things. We may be able to see possibilities that may not have occurred to you."

Many a prospect is far closer than you realize to wanting her kitchen completely modernized. Women usually like to change the house and the refrigerator can very well be the pivot around which to do it. Most old kitchens were poorly planned, and a rearrangement of space will usually make room for a good sized refrigerator, especially when you can show that a modernized kitchen will be more compact, more usable, easier to work in. Get a plan made up and sell the permanent benefits to be had from the total improvement.

YOUR SALES ALLIES

PUGET SOUND POWER & LIGHT CO. • WASHINGTON WATER POWER CO. • PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. • UTAH POWER & LIGHT CO. • IDAHO POWER CO. • THE MONTANA POWER CO. ROCKY MOUNTAIN ELECTRICAL LEAGUE

Use the MKB material

Pick the Appeals

to fit the customer

Plus Value Appeals

Over and above the original appeals, the new refrigerators now offer these plus values:

Plus power — a safety surplus — exclusive with electric refrigerators, by the way — that keeps food safe no matter the weather.

More Ice capacity—freezes twice as fast.

Costs half as much to operate.

Costs half as much to buy as 10 years ago.

Monthly payments less, less carrying charge, terms longer.

Has more usable space, is more accessible, more conveniently arranged.

More dependable, less service, plug it in and forget it.

Silent—new designs have eliminated noise.

Holds lower temperatures for frozen foods.

Better styling, better looking, finer finish and hardware.

More features.

Economy Appeals

Saves in buying — bargain quantities may be bought at savings and kept.

Wastes from spoilage reduced.

Left-overs can be saved and served in new combinations several days later.

Reduces expensive last minute small purchases of food.

Fewer trips to market, avoid traffic.

Saves fuel—larger quantities can be cooked and kept safely, saving time in meal preparation.

Desserts made inexpensively at home.

Luxury Appeals

Makes entertaining easy. There can be a good supply of food on hand always for the unexpected guest or for special parties and affairs.

Improves the taste and appearance of green things, leafy vegetables for salads, etc.

Keeps food appetizing and sweet longer.

Plenty of ice for beverages and desserts.

Makes variety possible in meals.

Is a unit of the all-electric kitchen she will want tomorrow.

Decorates the kitchen, builds pride in the home.

Helps mothers because children can get own meals easier, make up lunches, prepare successful salads and desserts.

Health Appeals

Protects the family food supply against decay, spoilage, and bacteria.

Preserves the elusive vitamins in foods that die when kept at higher temperatures.

Keeps vermin and flies away from the food.

Saves steps and standing on the feet, because everything is handy in one place. These contribute to the health of the homemaker.

Future Campaigns

Refrigerator promotion heads utility programs for April

Cool drinks, fresh foods for the hot summer months in the West to come are the incentive back of the refrigerator campaigns scheduled for April and May. Electric ranges also share the limelight with several special shows and cooking schools arranged for Mr. and Mrs. Pacific West.

Brit. Columbia Electric Railway Co., Ltd.—Electric range campaign for April and May, the latter tying in with the annual president's month. Special refrigerator shows at all stores. Annual president's month campaign for May, participated in by all employees of all departments.

Electric Appliance Society of Northern California—Electric refrigerator campaign scheduled for April 8—May 4.

City of Glendale, Public Service Dept.—Cooking schools, demonstrations of electric ranges.

Idaho Power Co.—Annual spring range campaign began March 6, continues until May 4. Features I. Q. Cookery Test. Grand prize of electric dishwasher and sink is to be awarded at end of contest. Electric water heater campaign set for May.

Los Angeles Bureau of Power & Light—Electric range campaigns for April and May. Local dealer electrical appliance expositions.

Mountain States Power Co., Casper, Wyoming—Range and air coolers campaign for April and May; at Douglas, Wyoming, range campaign and cooking school for April, refrigerator, air cooler and range campaigns for May.

Nevada-California Electric Corp., refrigerator campaign for April and May. Special exhibit at San Bernardino Orange Show.

Public Service Co. of Colorado—Refrigerator light conditioning, street and highway lighting and adequate wiring campaigns for April and May.

Pacific Power & Light—Refrigerator campaign for April; all electric kitchen showing in May.

Puget Sound Power and Light Co.,—range and water heater campaign for April. Dealer range campaign for April, May and June.

San Diego Bureau of Radio & Electrical Appliances—Laundry equipment and refrigerator campaign for April. Fourth Annual Spring Fair set for April 30-May 5.

Southern Colorado Power Co.—Range and water campaigns for April and May.

Southwestern Public Service Co., Roswell, N. M.—Mazda lamp and spring exposition for April; roaster campaign for May; Carlsbad, spring exposition for April and May.

Tacoma Light Division—Three-day cooking school, April 17-19.

Trinidad Electric Trans. Ry. & Gas Co.—Refrigerator displays in April. Electric range, cooking school in May.

Utah Power & Light Co. and subsidiaries—Cooking, poultry brooding, water heating and soil heating campaign for April and May.

Western Colorado Power Co. Electric range and brooders campaign for April. Ranges for May.

Western Public Service Co.—Range and refrigerator campaign for April and May.

● A HANDSOME NEW FOLDER on Thor washers and ironers includes an interesting and effective new use of background. Various pictures of Thor models are placed in drawings of electric kitchens, thus giving this type of kitchen a real boost. The washers and ironers themselves lend a distinctive beauty to these already beautiful kitchens.

APPLIANCE SALES REPORT, 1940

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		Northwestern Elec. Co.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]	San Diego Cons G. & E. Corp.[5]		San Joaquin Power	Southern Calif. Edison Co., Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.	
	Curr.	1 Mo.	Curr.	† Mo.	Curr.	† Mo.	Curr. 12 Mos.	Curr.	1 Mo.	Curr. 12 Mos.	Curr.	2 Mos.	Curr.	1 Mo.	Curr.	1 Mo.
Ranges								21	21		144	255	117	117		
Water Heaters								24	24		41	87	23	23		
Air Heaters, aux.											114	394	189	189		
Air Heaters, 220																
Refrigerators								466	466		2,289	4,605	402	402		
Dishwashers													3	3		
Washers								358	358		2,069	4,192	768	768		
Ironers								49	49		304	586	103	100		
Vacuum Cleaners								253	253		681	1,567	424	424		
Radios								1,047	1,047		5,089	10,844	2,306	2,306		
Mixers								86	86		171	614	286	286		
Cookers, Casseroles								44	44		72	49	25	25		
Irons								372	372		844	1,938	1,024	1,024		
Waffle Irons								61	61		281	904	652	652		
Toasters								209	209		402	1,071	782	782		
Table Stoves								60	60		178	378	261	261		
Heating Pads								162	162		193	561	842	842		
Curling Irons											23	67	231	231		
Coffee Makers								235	235		213	520	601	601		
Sewing Machines								114	114				171	171		
Clocks								371	371		398	880	336	336		
Fans											12	23	3	3		
Floor Polishers																
Sun Lamps											33	69	12	12		
Reflector Lamps																
Misc. Lamps																
Shavers											157	383				
Yard Lights													52	52		

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers.

[2] Lists appliances sold by dealers in Portland area. Figures compiled by Northwestern Electric Company.

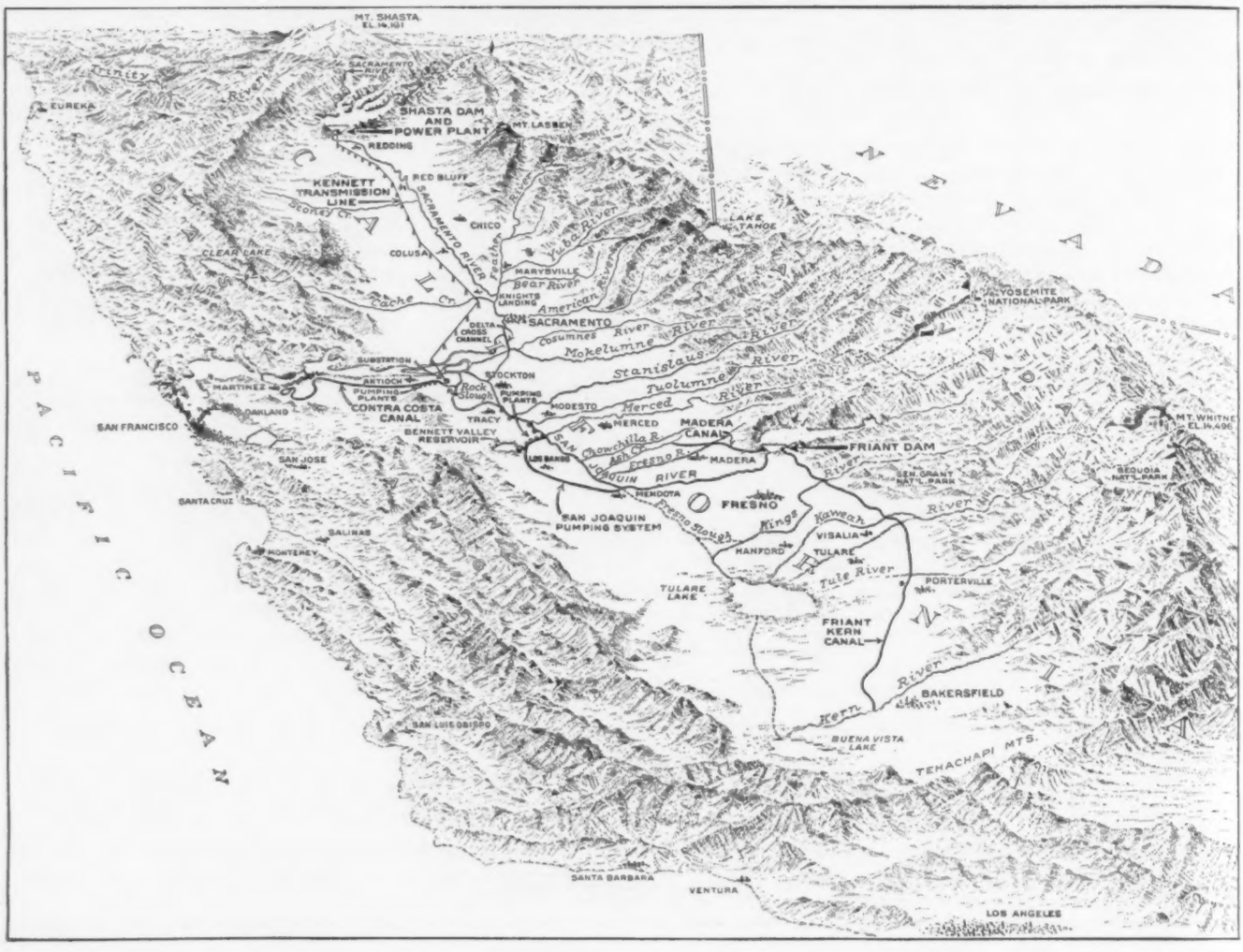
[3] Combined dealer and company sales from report of Montana Power Co.

[4] Figures are being consolidated with San Joaquin Power and are not available this month.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures include fans, curling irons and sun lamps.

[7] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.



Powering the Great Valley

By Lester S. Ready

A consulting engineer views the means of getting power from Central Valley Project's plant to California's breadbasket

CENTRAL VALLEY Project was established because steps toward water conservation were imperative. They were necessary for: (1) salinity control in the Delta; (2) supplementing dry year deficiencies in over-appropriated streams and overdrawn underground supplies; (3) additional irrigation and domestic use.

The Project combines the urgent need for water conservation with other services beneficial to the Great Water Central Valley—services which can carry much of the burden of annual costs or against which part of the capital cost can be charged. The services which will be of most immediate financial aid to the Project include: (1) navigation, (2) flood control, and (3) power development.

The Central Valley Project Act definitely specifies the position of power as secondary. The Act provides "... Said unit is designated as the Kennett Dam, and shall be constructed and used *primarily* for improvement of navigation ...., for increasing flood protection ...., for salinity control ...., and for storage and stabilization of the water supply .... for irrigation and domestic use, and *secondarily* for the generation of electric energy ...."

The power facilities specifically provided for in the Central Valley Act and in the Federal Act include the Shasta power plant of 300,000-kw. capacity, main transmission lines to a point near Antioch, and a receiving substation at Antioch. Provision is also made in the Central Valley Act for a steam auxiliary plant (or plants) and additional transmission facilities as needed. Output characteristics of the Shasta plant will depend upon the policy established by the Reclamation Bureau as to opera-

tion of the Project under the limitations of the Federal Act. Studies of the possibilities indicate that if the plant is operated to give to power the greatest value commensurate with the minimum interference with navigation and irrigation, the plant can have a capability of 250,000 kw. or better, and an annual output of 1.5 billion kw.-hr., varying from 1 billion to approximately 2 billion kw.-hr. per annum.

The limitations necessarily placed upon the plant by irrigation, salinity control and navigation will cause the monthly output to vary from about 200 million maximum to approximately 50 million kw.-hr. under the most effective operation. However, if the capacity value of the plant is ignored, the minimum monthly output may drop to around 22 million kw.-hr., and the money value of the annual output reduced by more than $1,000,000.

Various analyses indicate that to absorb fully the output of the plant, a separate market of 2½ billion to 3 billion kw.-hr. per annum will be necessary; also that auxiliary steam facilities of 225,000 to 350,000 kw. will be required. If the power operations of the plant are coordinated with the system now serving the present market, utilization of 1 billion kw.-hr. per annum can be accomplished upon completion of the Project, and the full capacity absorbed within three to five years thereafter, without increasing the steam electricity capacity available in the tributary area.

Present Market

The present power market area in California, tributary to Shasta plant, extends from the Oregon line to Bakersfield. This market, at present representing an annual generation of approximately 6 billion kw.-hr., is supplied through a single, integrated, production and transmission system. Pacific Gas and Electric Co. produces in its own plants 75% of the energy required and transmits 96% of the energy used in this market.

The load center of the whole market is somewhat south of the town of Antioch in Contra Costa County; 50% of the market is in the counties bordering on San Francisco Bay; 20%, south of Stanislaus County; 10% in the counties of Solano, San Joaquin and Sacramento. Approximately 3½% of the power market is now supplied by municipalities and publicly owned utilities. Of the balance, 92% is served direct by PG and E, and 4½% by other utilities.

The California Railroad Commission has jurisdiction over PG and E as to rates, services and finances. More than 90% of the Company's capital has been invested under the Commission's general supervision. Throughout its 28 years of jurisdiction over electric utilities, the Commission has been an effective regulatory body.

Federal Policies Elsewhere

Before considering the specific question of policy in disposing of Central Valley power, it is well to summarize the policies effective on other Federal projects throughout the United States.

The first Federal project of importance—Boulder Canyon—was developed under a different policy than that in effect on similar projects now under construction. Preference in purchasing power is granted to public agencies. This preference applies to all the other projects as well and may be considered a fixed Federal policy. Power itself, however, is disposed of at the Boulder plant. The rate so far established has been based on the value of the power at the main market—the Los Angeles metropolitan area. Contracts provide that revenue from sales of this power shall return all costs incurred and shall pay 4% per annum on the capital invested by the Federal government.

Tennessee Valley Authority also gives preference to public agencies. The Authority has actively promoted the organization of municipal utilities, the building of transmission lines from the various plants to the municipalities and other public agencies, and the paralleling or acquisition of local utility systems by such agencies. In addition, it has promoted and established low rates for domestic service, and, in effect, has practically taken over the fixing of rates to be charged by those public agencies which use TVA power.

The Bonneville Act also favors expansion of public utility districts. Relatively low rates have been established for power purchased from the Project, and transmission lines are being built to serve various districts and municipalities which have been organized and are in position to purchase power. The Act apparently does not provide for financial aid to these districts for the building or acquisition of local distribution systems. It does provide for contracts with private utilities. In general, the policies established by TVA are being followed in giving preference to domestic service, promoting public utility districts and retaining a measure of control over the rates.

Fort Peck Project has a limited power development; not of such assured nature as to justify construction of a general transmission network. It may be expected that the ouput from this Project will be wholesaled largely to existing agencies.

Central Valley Project differs from Bonneville and TVA in that: (1) The plant output represents not more than 25% of the load of the tributary market; (2) the output is subject to wider fluctuations, owing to greater limitations imposed by the primary uses—irrigation, salinity control, flood protection and navigation; (3) the territory is already extensively served by a single private agency under effective regulation; (4) the Project itself and the area benefited (as well as areas tributary to it) are located entirely within one state; (5) the need for maximum power revenues to aid in supporting the Project is paramount.

There are two basic policies to be considered in the marketing of Central Valley power: (1) disposal direct to public agencies; (2) disposal to or through the existing private agency.

Temporarily, a combination of the two may be worked out, whereby power not required for use by public agencies may be sold in the interim to the private agency.

First Policy

These may be considered in order, First, disposal direct to public agencies.

The power facilities apparently to be constructed by the Reclamation Bureau include Shasta power plant and afterbay, the main transmission lines to Antioch substation and the substation itself, transmission lines to the pumping plant on the San Joaquin River and an auxiliary steam plant.

Disposal of the power output directly to state agencies, such as municipalities, municipal utility districts and irrigation districts, for redistribution, will require the financing and construction of an extensive transmission system by a state or federal authority. This system would have to include secondary transmission lines, substations and auxiliary steam plants in order to deliver adequate service to these public agencies.

The effective disposal of Central Valley power by this means will also demand the successful promotion of publicly-owned distribution systems throughout the Project area and the Bay district, since only 3½% of the present market is so served from widely scattered systems. This in turn will require the formation of new municipal utility districts and the construction of competitive systems, or acquisition of the existing system by such districts as well as by existing municipalities and irrigation districts.

The price charged by the Project for Shasta power delivered to a public transmitting agency will be fixed by the Reclamation Bureau. This price will also be made available to the private agency for such energy as it may purchase.

This method of disposal would not only assist in the promotion of public distribution of power, as well as create a competitive situation as to rates in northern California, but also would establish as a state policy the public ownership of electric utilities by state agencies. It would ignore the existence of an integrated and coordinated transmission system readily available to absorb the entire output and would call for duplication of a considerable number of facilities. Such a policy would also tend toward delaying the fulfilment of the aim of the Central Valley Project—to supply needed water—as it would result in political controversies which are always attendant upon the promotion of competition between municipal and private power systems.

Second Policy

Disposal to the existing private agency would contemplate coordinating the operations of the Shasta plant with the operations of the PG and E system and the sale to PG and E of the whole output except for Project pumping plant requirements. It would also embody fixing of the Company's rates by the Railroad Commission.

No added capital would be required for the Project in excess of the amount representing cost of power plant and afterbay, cost of main transmission lines extending therefrom to Antioch and thence to the pumping plant, and cost of auxiliary steam facilities to firm the plant output and assure maximum value of energy produced.

The wholesaling of Shasta power to PG and E would effect the quickest and most complete utilization of the output. The growing market of the entire tributary area would be available to absorb the plant output and much of the existing steam-produced energy could be displaced at the start. Studies indicate that 1 billion kw.-hr. per annum could be absorbed at the time the plant is completed and the entire capacity utilized wihin three to five years hereafter.

The price at which the power would be sold by the Project would apparently be established by the Reclamation Bureau and would be the same as that which a state transmission agency would pay.

Under both methods, the relative revenue to be received from the sale of energy by the Federal government to meet financial obligations of the Project would depend upon the extent the power is put to use. Unless the Reclamation Bureau requires as a condition to the sale of energy the establishment of rates on the private system which are satisfactory to the Bureau, any benefit resulting from a lower charge for Shasta power than for power furnished by the private agency would depend upon effective regulation of PG and E's rates by the Railroad Commission.

Disposal of the power to the existing agency would eliminate large expenditures by state agencies for secondary transmission lines, substations and steam plants and would make available an early utilization of the Shasta output at equal prices for power wholesaled from Antioch substation, which should tend to give a higher revenue to the Project during the first years of its existence.

On the other hand, this procedure would not provide a directly competitive market for determining the fair price for Shasta power or lay the groundwork for promotion of public distribution of power. It would not make available to public agencies an independent source of power for competitive systems or act as an aid to force the sale of existing systems to state agencies. Nor does it fully comply with the general policy of the Federal government and the provisions of the Central Valley Project Act for delivery of power to public agencies.

Modified Plan

A modification of the second method, whereby public agencies would be assured of rates fixed on the price paid for Central Valley power, would have many advantages. This method would contemplate delivery of Shasta power to PG and E at Antioch under a contract providing that non-competitive state agencies throughout the tributary area could have the price they paid for power wholesale established on the basis of the price paid at Antioch for the energy, plus a reasonable system-wide cost of transmission and auxiliary service.

The price differential could be fixed by contract between the Reclamation Bureau and the Company, or established by the Railroad Commission. To the extent that the price paid for Shasta power was below present costs on the Pacific Sysem, wholesale rates to the publicly-owned systems would be reduced.

Under this method an equivalent of a competitive market for fixing the price of Shasta power would be created, the power would be more quickly absorbed and the annual revenue to the Project would be greater than under the other policies considered. Existing conditions would be recognized and requirements of the Central Valley Project Act and the Federal Power Act would be met. It would not interfere with or hinder the orderly expansion of public power distribution where desired. It would eliminate the economic losses resulting from duplicate facilities.

Summary

The various aspects of this procedure may be summarized as follows:

1. Rapid absorption of Shasta output through coordinated operation would result.

2. Price would be fixed in effect upon competition with publicly operated systems, thus assuring maximum revenue to the Project.

3. Benefit of Central Valley Project power would be available to all non-competitive State agencies rather than to only those agencies within immediate transmission distance.

4. Extension of advantages of Project power over entire tributary area would be obtained.

5. Capital expenditures by a State Authority for auxiliary steam electric plants, transmission lines and substations would not be required.

6. Attention would be directed to the basic objective of the Project: water development and stabilization of economic foundation of Valleys.

7. Idle plant severance damages assessable under condemnation of existing distribution systems by public agencies would largely be eliminated.

8. It does not prevent the ultimate acquisition of entire power facilities by the Authority if desired but does eliminate the acquisition of a partially duplicate system when that step is taken.

9. Orderly condemnation of utility properties by logical districts would be facilitated.

10. Eliminates possible delay in fulfillment of Project aims for supplying needed water, which delay could be expected to result from political controversies attendant upon promotion of competitive State and district power systems as a condition of the success of the Project.

11. Does not make available to cities or districts power for actual or threatened competition.

12. Does not promote public distribution of electric energy as a condition to successful financing of Project.

Blowing-in a Booster

Alaska utility has simple method of connecting and disconnecting

By D. F. YOUNG
Ketchikan Public Utilities, Alaska

In connection with installing booster transformers, particularly temporary installations on branch feeders, Ketchikan Public Utilities has adopted methods of testing and connecting which make the procedure quite simple.

The procedure is easily illustrated by example. Suppose a 2,200-volt line carrying 40 amp. is to be boosted 5%. Five per cent of 2,200 volts equals 110 volts. At 40 amp., this amounts to 4.4 kva. The nearest commercial transformer size, 5 kva., would be used. As the secondary must carry full line potential to ground or case, insulation tests are made between secondary and ground, as well as between primary and secondary, and primary to ground.

For testing connections, a small distribution transformer is used to obtain primary potential within the premises where the booster is being installed. The unit to be used as a booster is connected to this primary voltage, which is read as in Fig. 1, connection A.

With the booster secondary connected for 110-volt service, one primary lead is connected to the adjacent secondary. Voltage between the other primary and secondary is then read (Fig. 1, connection B.).

If this reading is greater by 110 volts than that obtained with connection A, the connections are correct for boosting. If less by 110 volts, connections must be reversed.

To connect the unit, a section of the primary line is jumpered to permit the installation of a strain insulator as shown in Fig. 2. With the booster in position, the common primary-secondary lead is connected to the line side of the strain insulator. The free secondary lead is connected to the load side of the strain insulator. An expulsion-type cutout, X (Fig. 2), fused to carry line current, is installed across the strain insulator. Then the solid jumper is removed. The remaining free primary lead is connected to another cutout, Y, which is permanently installed, connected to the line wire.

If fused, this cutout should be fused at 200-400% of the unit's rating. In the above example, a 10-amp. fuse would be used. Closing cutout Y will cause the fuse in cutout X to blow, placing the booster in service without a power interruption. Removal of the temporary cutout, X, completes the installation.

Outdoor Turbine

Glendale will have first hydrogen-cooled unit to be unhoused

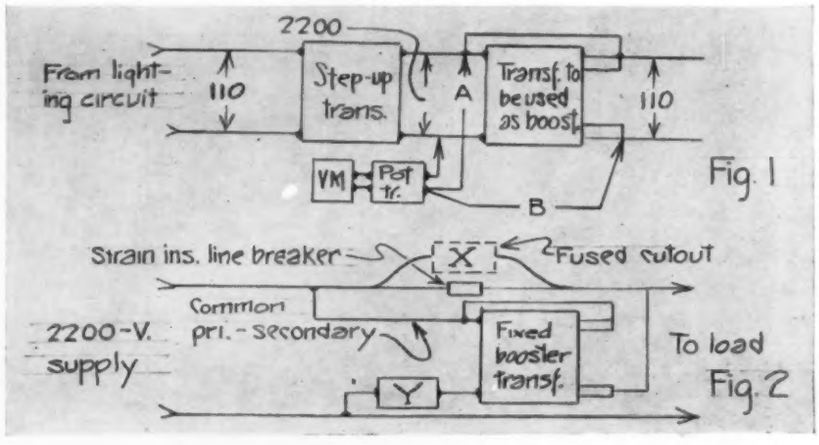
What the City of Glendale's new outdoor turbine will look like became apparent last month, when General Electric Co. released the architect's drawing shown to left. The absence of heavy building structures represents a substantial saving over conventional steam stations, and the design is therefore looked upon as a possible forerunner of a new trend.

Such a plant is particularly suited to California for two reasons: the climate is generally mild; the cost of power plant buildings is frequently somewhat higher by reason of the necessity for earthquake-proof construction.

The Glendale unit will be situated on an open deck, as shown. Basically, the unit will be the same as though built for conventional installation indoors, except that a welded sheet-steel housing will be placed over the turbine's high-pressure end. The plant's boilers and firing aisle are to be inclosed with stucco-covered, light-steel frame housing. A traveling gantry crane will serve the turbo-generating unit. Control panels will be situated in the station basement.

The unit has the distinction of being the first hydrogen-cooled turbo-generator to be installed outdoors.

It is rated 20,000 kw., 13.8 kv., 3,600 r.p.m., and will operate at 0.8 power factor, or a total output of 25,000 kva. Steam gage pressure will be 600 lb. per sq. in., back pressure 2 in. Hg. Delivery is scheduled for August.



Where Unit Stations Fit Into P G and E's Distribution Plant

By R. B. Kellogg

EVERY electric operating utility has had to meet the problem of a growing distribution system wherein the new load coming on is gradually extended beyond the economical reach of the existing feeder system.

Frequently it has been found that the cost of extending feeders from existing substations has become quite expensive, especially where the new residential areas are being developed in isolated locations. These new loads frequently do not justify the type of substation required in a more congested area, such as large transformer capacity, induction regulators, a group of feeders, and attendant real estate and building; and often the loads do not develop much beyond 1,500 to 2,000 kva. for a considerable period of time.

It is not economical in these instances to plan for a large substation where certain basic investment costs must be met and then wait for the load to build up to the economical capacity of the units first installed. It has been found more economical to make a smaller installation, one that more nearly fits the size of the anticipated load, and then, if load increases must be further met, to add a second unit in the same location, or perhaps to add another unit in an adjoining area.

The factory-built unit type substation presents a possible solution to this problem. Being totally inclosed and complete with transformer, metering equipment, and each feeder oil circuit breaker (equipped for automatic reclosing), and provision for voltage regulation, they can be installed at the load center with a substantial saving in the labor of installation. They are inconspicuous and more easily camouflaged by simple landscaping, if necessary, and are ready to go into operation simply by connecting the incoming and outgoing loads. Only other necessary work is in connection with land, fence, concrete pad and high-voltage-supply switching and protective devices.

Very little investment in reserve transformer capacity need be purchased at first. The capacity of the unit can approximate actual load demand, because growth can be absorbed by the addition of a second unit. Short-time, uncertain loads such as those occasioned by construction jobs, dredges, flood control, and the like, can be supplied with this type of substation, and, when demand ceases, the unit can be moved to another location with a salvage value of almost 100%.

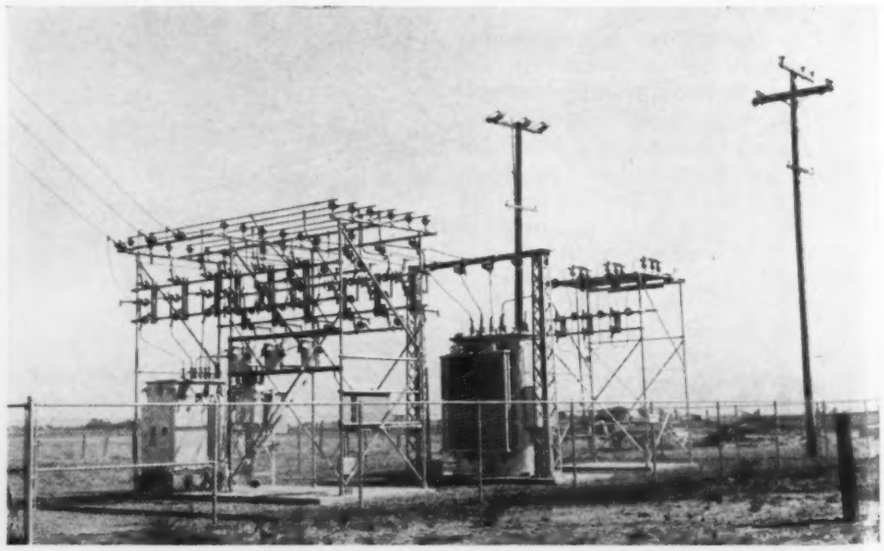
Pacific Gas and Electric purchased two unit-type substations in the latter part of 1939. One unit was installed in Oakland at 73d Ave. and Beck St., and is supplying a rather dense residential and commercial load. The second unit was installed at the present site of Walnut Creek substation, which is in suburban territory, and the load consists of residential and semi-commercial consumers. Both substations are of 2,000-kva. capacity with provision for the addition of automatic blower equipment which will increase the rating to 2,500 kva. at a low initial cost. The Beck Street unit is rated 12,000/4,320 volts, and the Walnut Creek unit is rated 23,000/4,320 volts. Both are built with one outgoing distribution feeder, 4,320-volt, 4-wire, wye-connected.

These stations have been in operation about two months and so far have proved to provide all that was expected of them. They were tested and placed in operation one or two days after preparing the site.

Fig. 5 is a view of Beck St. unit substation, and shows the character of the district served. It will be observed that the unit is not unsightly, and no landscaping is necessary in this location. The supply cables and 4-kv. feeder cables are underground to nearby riser poles. The high-voltage air switches and fuses are mounted on these poles. Fig. 4 is another of Beck St. substation showing the general arrangement.

Fig. 3 is of the Walnut Creek unit.

Fig. 1—This substation is typical of those formerly used where unit types are now applied



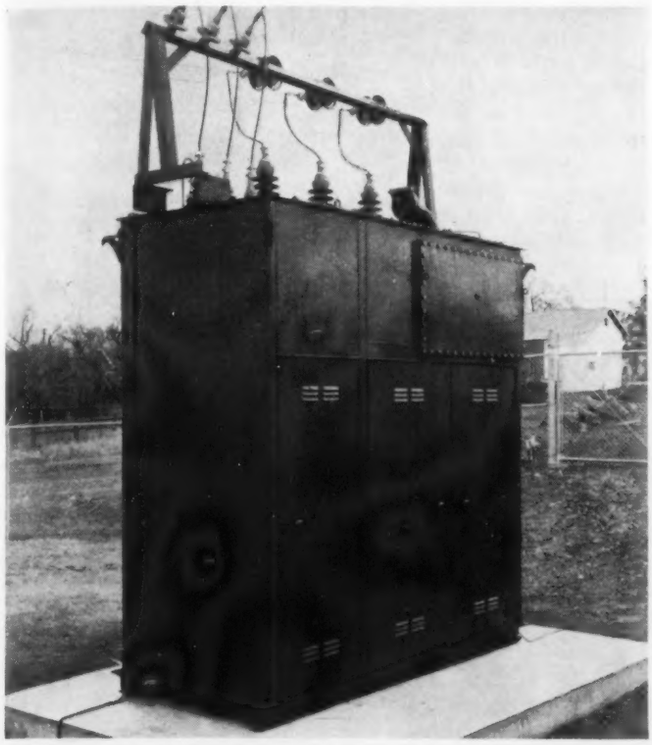


Fig. 2—Walnut Creek unit showing high- and low-voltage connections

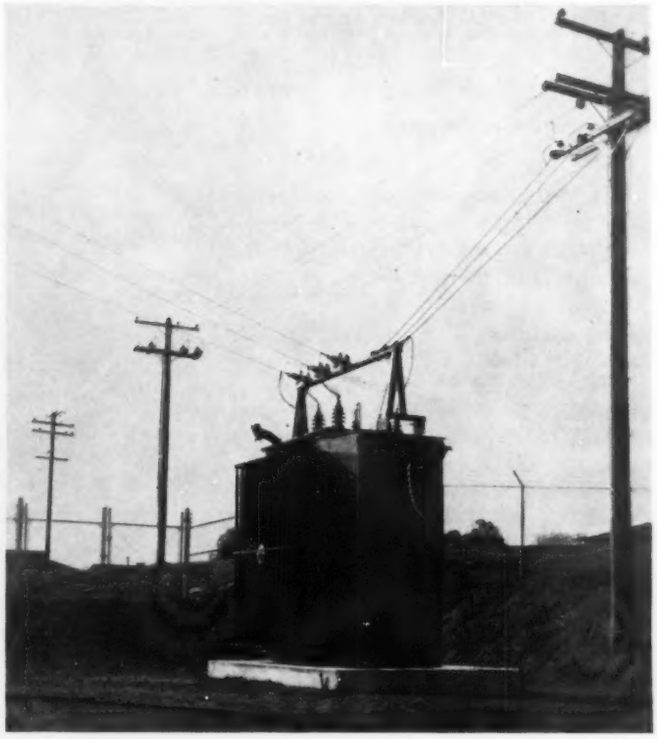


Fig. 3—Another view. The unit is 2,000-kva., 12,000/4,320-volt

The 23-kv. and 4-kv. leads leave this station overhead. This provides a simple get-away without presenting an unsightly appearance. The A-frame supporting the deadends was supplied by the manufacturer at a small additional cost.

There is included a view of a typical outdoor substation which is more or less of a standard design with PG and E. This is shown in Fig. 1. It is interesting to note the absence of pipe structures, exposed buses, disconnects, etc. at either the Walnut Creek or Beck Street installations.

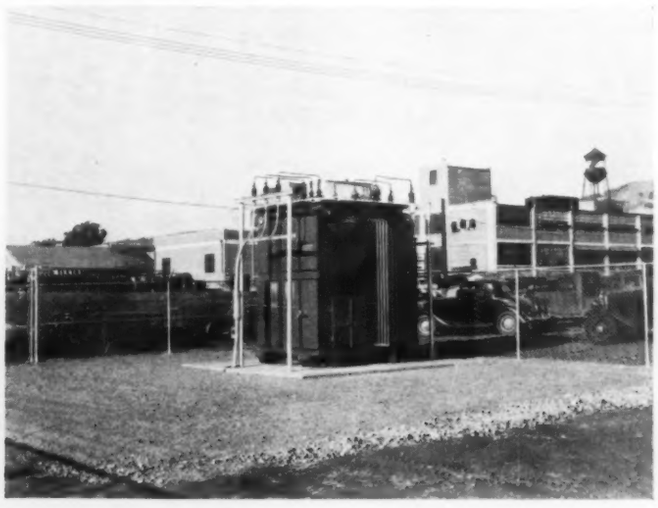
Both designs of substation arrangement accomplish the same purpose although, in all fairness, it must be mentioned that with the former type of design, a second 4-kv. bus serving as an auxiliary bus is incorporated in the design, and there is also provision for switching any oil circuit breaker and its associated regulator out of service for maintenance work without interrupting service or doing any switching in the field on overhead circuits. In addition there is provision, and the pipe structure and concrete pad are installed, for a second 4-kv. feeder. To complete facilities for a second feeder, it is necessary only to install and connect the oil circuit breaker and regulator at slight expense. The factory-built standard unit type subs do not have these features.

Fig. 2 is a close-up of Walnut Creek unit. No landscaping is necessary because this location is suburban and not in a highly restricted district.

It is difficult to compare costs as experience has shown that no two substations are exactly alike. Local conditions which cannot be disregarded and such other intangible factors as appearance, accessibility and safety must be carefully evaluated in each case. The unit stations have, however, fitted these requirements to the extent that the purchase of additional units of this type is proposed by this company this year.

Fig. 4—Beck St., 12,000-volt riser pole and air switch, unit beyond

Fig. 5—Background indicates character of the district being served



New Breaker Tested

Compressed-air used to operate unit and to extinguish arc

The testing of a compessed-air circuit breaker at the Westinghouse East Pittsburgh (Pa.) works last month aroused the interest of more than 200 electrical men who witnessed the test.

The compressed-air breaker, a newly developed device, was tested on power interruptions ranging from the opening of normal load current of 2,000 amp. at 13,200 volts to the 3-phase, 1,500,000-kva. short-circuit capacity of the laboratory. Oscillograms made during the demonstration showed that all currents were interrupted at the first current zero, with about one-half cycle of arcing, and throughout the entire range of tests no transient voltage greater than twice normal was observed.

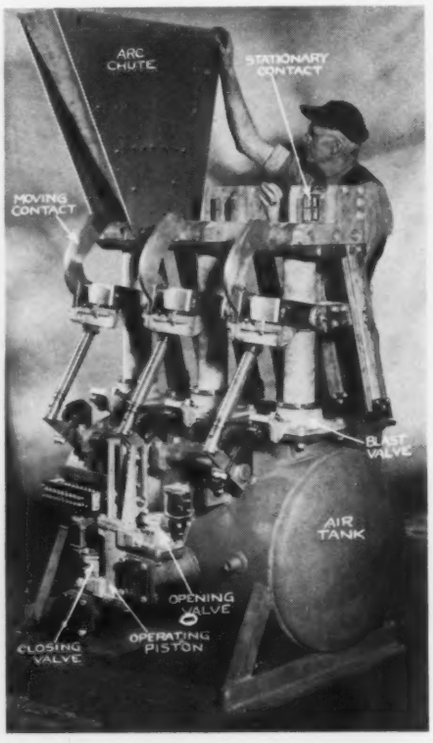
The interrupting element of the new breaker uses a cross-blast of compressed air. The blast passes between separated contacts in such a manner that the arc is driven against insulating splitter plates. Just before separation of the contacts the air blast is turned on and the contacts part in such a way as to draw the arc near the edges of the diverging splitter plates. Quickly elongated between the splitter plates by the air blast, the arc is reduced in cross section and driven against the plates. By the time a current zero is reached an intense diffusive effect has de-ionized the arc space rapidly thus causing the arc to be interrupted.

Westinghouse points to several advantages of the air mechanism. Essentially, it consists of an air cylinder in which a piston moves vertically. The piston is connected by cranks and levers through insulating pull rods to each of the three movable contacts. A trip-free mechanism is considered unnecessary, since equivalent results are obtained with proper control of the air-operating mechanism itself.

For opening the breaker, air is admitted to the upper part of the cylinder by means of an electrically-controlled air valve, thus forcing the piston downward. By this means an opening force of as much as 3,000 lb. may be obtained, the corresponding speed of contact motion being from 15 to 20 ft. per sec., which is equivalent to complete opening in about 1½ cycles.

By supplying air for opening from an auxiliary tank of limited volume, the force of air on the piston diminishes gradually as the breaker contacts travel toward the open position. Shock at the end of the stroke is thereby minimized.

This auxiliary tank extends into the main tank and consists of a large tube closed at both ends, except for a small orifice. This allows the auxiliary tank to recharge at a rate which is slow in comparison to the opening speed of the breaker. Piston speed is further checked by discharging the air through an orifice, instead of opening the cylinder to atmospheric pressure. The breaker is

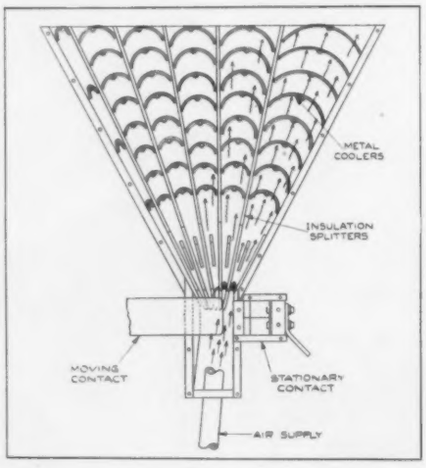


Details of compressed-air circuit breaker

closed in the same manner as it is opened, except that air is supplied from a secondary auxiliary tank to the space below the piston by a second set of valves.

Arc Extinction

The breaker cannot be opened unless the air blast is turned on beforehand. Co-ordination of contact motion with



blast-valve operation is achieved by direct mechanical connection between contacts, air-operating mechanism, and the blast valve which controls the interrupting air stream. The three blast valves are poppet type, streamlined, and are mounted at an angle in the base of the vertical tube supplying air to the interrupter.

As the blast is turned on it directs the arc into a "throat" formed by side walls of fiber and the slots in the ends of the splitter plates. Under nonarcing conditions those splitter plates nearest the stationary contact receive most of the blast impact, but if the arc current is instantaneously high, generation of gas from the fiber splitters builds up enough pressure to divert part of the air stream toward the splitters farthest from the fixed contact, and superfluous ionized gases are carried away. This action is enhanced by flaring the side walls of the throat on the contact side of the splitter end. This construction is to divert part of the air stream sidewise when the arc current is high.

Copper "tongues" are introduced parallel to the splitter plates to limit looping of the arc between plates to an amount sufficient for interruption.

A muffler placed at the end of the chute serves to eliminate residual flame and reduce noise. It consists of a mixing chamber, followed by a series of perforated metal plates.

Air Supply

If several breakers are installed, two independent systems are used for air supply. Each consists of a compressor unit, two storage tanks, cooling coils for the condensation of water vapor, and auxiliaries. Space economy makes it expedient to store air at 250 lb. per sq. in. and to use a reducing valve to obtain 150 lb. in air line and breaker tanks.

Breakers are equipped with tanks containing sufficient air for two circuit interruptions with the supply cut off. About 20 lb. pressure is used for each closing-opening operation. The breaker will open 1,500,00 kva. with a tank pressure of 105 lb. Dry air is essential only to prevent possible freezing at valves.

Approximately 2,000 interrupting tests have been made on a 1,500,000-kva. breaker of this type. Single-phase interruptions have been made of currents from ¼ to 65,300 amp., with 13.2 kv. across the contacts. Throughout the range, no transient voltage greater than twice normal was observed.

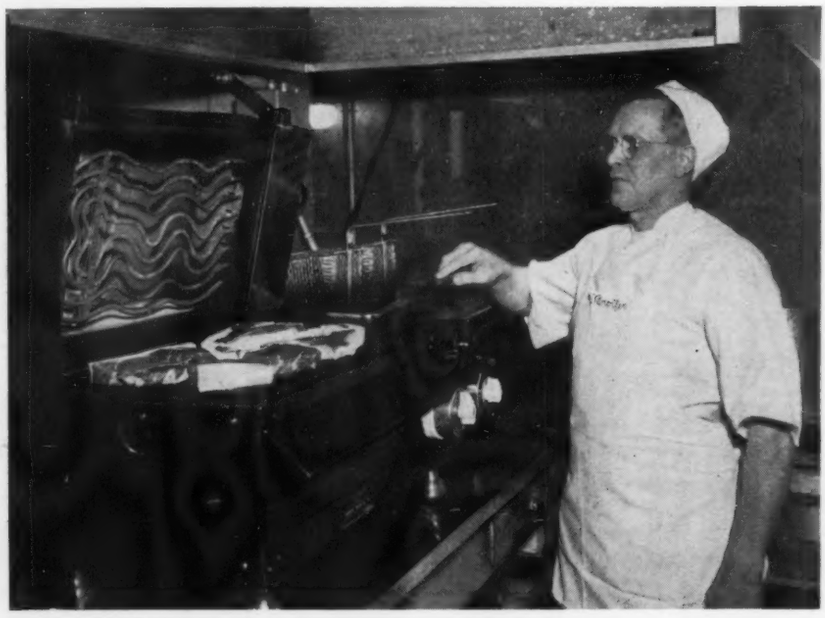
A 1,500,000-kva, 15-kv breaker requires a space of 54x33 in. by 120 in. high.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 18

SUBJECT.....DOUBLE-FIRE HORIZONTAL BROILER
CUSTOMER.....THE BROILER, PORTLAND, ORE.
TYPE OF BUSINESS.....RESTAURANT
SERVICE COMPANY.....PORTLAND GENERAL ELECTRIC CO.

Prepared by Daniel Brown for the Commercial Section



This electric broiler (see table) replaced fuel-fired equipment for broiling steaks. The base, or lower section, is equipped with an Edison, B-9, 4-kw. cast-in Calrod unit, with thermostatic control and three-heat switch. The thermostat, Wilcolator Type Q, has its bulb clamped in a groove cut in the underside of one grid. The same type of thermostat is used in the upper section.

The upper section, or cover, is 24½x 14½ in. by 6½ in. high, including stainless-steel housing for terminals and thermostat control with relays. Two 1-in. holes, punched in the back, permit steam escape. All four sides are insulated with ¾ in. of transite. Calrod elements, totaling 3,600 watts are suspended within on adjustable clamps to permit raising or lowering. The thermostat bulb is fastened under a metal shield and at the center of the inside of the cover. The control dial is outside. The cover is so hinged that, when closed, the space between upper and lower heating elements is about 1½ in.

Wattage density of the upper section is 10.3 watts per sq.in. of cross-section (349 sq.in.).

Operation

A kilowatt-hour check meter was installed on the broiler for eight weeks and read weekly, yielding the data shown in the table.

Realized Advantages

Compared with a fuel-fired broiler, the electric unit: (1) produces juicier, better-looking steak; (2) causes 30% less shrinkage; (3) broils twice as fast without burning; (4) broils both sides evenly, marks one attractively; (5) makes turning of steaks unnecessary, saves labor and handling; (6) operates at very low fuel cost; (7) does equally good job on hamburgers.

Alternate Design

In an alternate design, B-9 units are provided both top and bottom, in suitable metal housings, the upper unit being inverted. On the same basis as the foregoing, this equipment costs about $200, minimizes attendance, produces markings on both sides of the steaks. The upper section is pivoted at the back of the broiler, is counter-balanced with springs and weights. Preheating time is 19 min. for the upper unit, 21 min. for the lower, both at 550°F. Stand-by loss at 550° is 1.5 kw.

Customer's Testimony

. . . After three months of service, I find that this broiler broils steaks that are juicier, and at least with 30% less shrinkage; and it is so designed that it holds the smoke while the steak is being broiled, causing the smoke to permeate the steak better than in a charcoal broiler.

The cost of operation is very low. Having kept an exact record, we find we used 1,760 kw.-hr. in three months, while running about 200 steaks per day. This amounts to $5.28 per month—much less than the operating cost of our former installation.

(signed) W. M. DEANE

Equipment Installed

Horizontal, double-fire electric horizontal broiler as described above, with Edison B-9, 4-kw. Calrod unit in lower section, 3.6 kw. of Calrod elements in upper section. Labor and material cost (no profit or overhead)....$150

Operating Data

Product	14-16-oz. steaks, ¾-in thick
Production	200 steaks per day
Production time, rare steak	3 min.
Medium steak	4 min.
Well-done steak	5½ min.
Operating period	
	(restaurant open) 9 hrs. per day
	(restaurant open) 9 hr. per day
minimum	110 kw.-hr. per week
minimum	170 kw.-hr. per week
Temperature	200°—500°F.

* Based on weekly measurements over 8-week period beginning November, 1939.

Alternating Type

THE PACIFIC COAST ELECTRICAL ASSOCIATION

Industrial Data Sheet No. 2

SUBJECT.....ENAMEL BAKING OVEN
TYPE OF WORK.....GASOLINE PUMP FINISHING
PLANT.....S. F. BOWSER & COMPANY, ALHAMBRA
SERVICE COMPANY.....SOUTHERN CALIFORNIA EDISON

Prepared by W. B. Cheney

Problem

In connection with the enameling of sheet-steel sections which make up the casings of gasoline pumps used in automobile service stations, it was desired: (1) to reduce the time required for drying the enamel finish; (2) to obtain a finish that would stand up under outdoor service conditions.

Solution

The foregoing were accomplished by installing an electric oven. Previously the enamel was air-dried. The oven is 5x5 ft. by 6 ft. 6 in. high, with double doors. Built by the user, it has sheet-steel lining with 2 in. or rockwool insulation and is equipped with the electrical facilities shown in the table. There is a 440-volt power supply and a 110-volt control circuit.

Operation

1. The oven is charged with approximately 120 sheet-steel sections, carried on a special supporting steel rack weighing about 100 lb.

2. The temperature is automatically held at a selected point between 200° and 300°F. by thermostat, the bulb of which is mounted at the center of the ceiling.

3. A 110-volt contactor coil and 110-volt control circuit are used.

4. Heating units are connected in series across the 440-volt power supply. A safety door switch prevents accidental contact with heaters when energized.

5. Average baking time is 50 min.

Realized Advantages

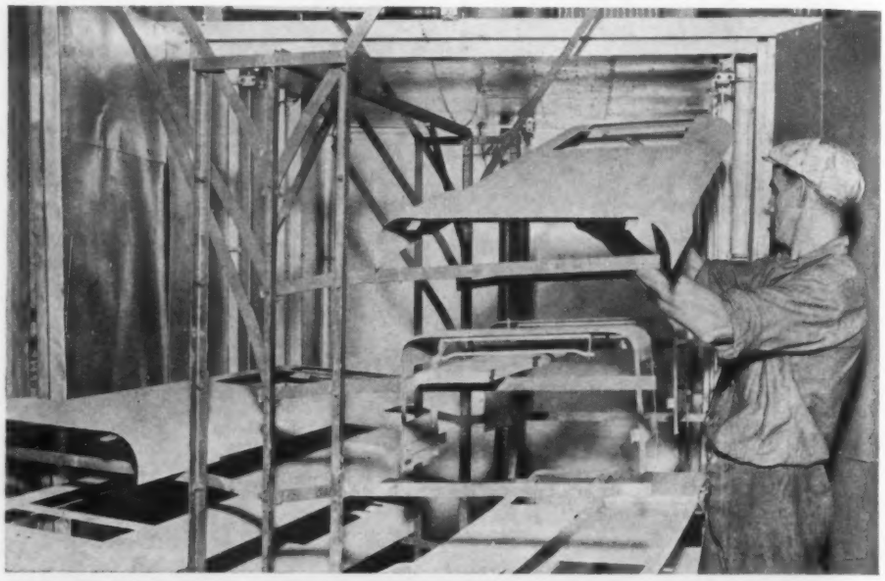
1. The new baked finish is more durable.

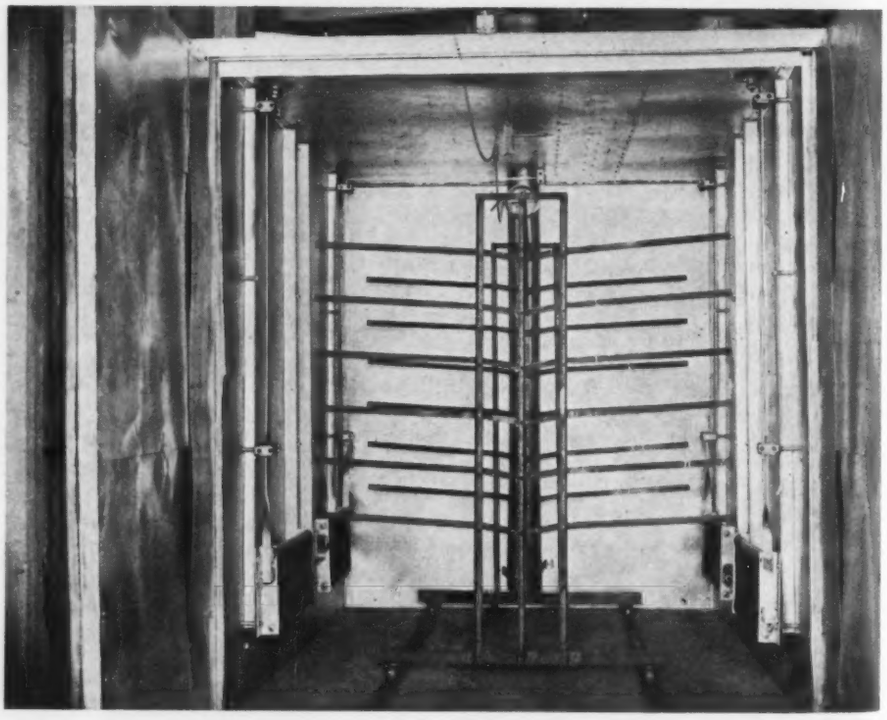
2. The baked finish is more lustrous and attractive.

3. Operating cost is low.

4. The ratio of consumption to connected load is improved.

5. Production is increased—a pump may be crated just 1 hr. after the finish is applied; this includes baking time.





Equipment Installed

4—3.8 kw. 110-volt G-E oven type heaters	Lot	$59
1—CR 2992 G-E thermostat		12
1—G-E contactor, 440-volt		25
1—G-E Safety door switch		16
Misc. bus-bar supports, thru wall terminals and busbar	Lot	25
		$137

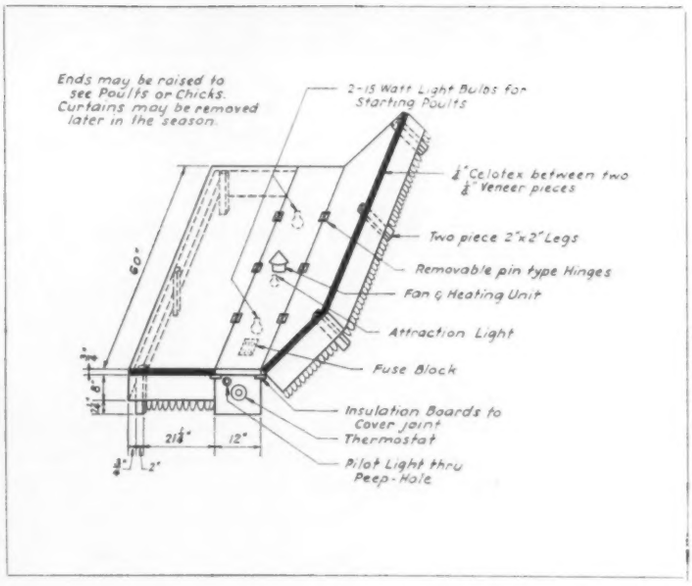
Electric Brooding

Oregon poultryman finds method most efficient and economical

By G. H. Bliesner

TESTIMONIALS on the successful application of electric brooding to young poults continues to accumulate as more and more turkey raisers turn to this economical and efficient method of raising their young birds. Among recent satisfied users of electric brooding is Fred Bowlby, Hillsboro, Ore., poultryman, who successfully used electricity to brood 3,900 poults in 1939 and who has a new brooder house especially adapted to electric brooding for the 1940 season.

During his ten year's experience as a turkey raiser Bowlby has tried practically all types of brooder from the Dutch oven to the coal stove. Last year he constructed his first electric brooders. These were 5 x 5-ft. forced-air models in which a Lyon No. 3 880-watt brooder kit furnished the heat. The accompanying sketch shows details of construction, including the method of insulating the top of the brooder with ¼-in. Celotex. The hinged construction permits easy access to the brooder for inspection, feeding or cleaning. Total cost of these brooders was approximately $25 of which the electric heating kit was the major item.


Ends may be raised to see Poults or Chicks. Curtains may be removed later in the season.
2-15 Watt Light Bulbs for Starting Poults
½" Celotex between two ¼" Veneer pieces
Two piece 2"x2" Legs
Removable pin type Hinges
Fan & Heating Unit
Attraction Light
Fuse Block
Insulation Boards to Cover Joint
Thermostat
Pilot Light thru Peep-Hole
60"
21⅜"
12"
2"

Sketch of forced-air type brooder constructed at cost of less than $25 for brooding turkey poults. Chicks may easily be seen by raising hinged ends of brooder. Celotex thoroughly insulates

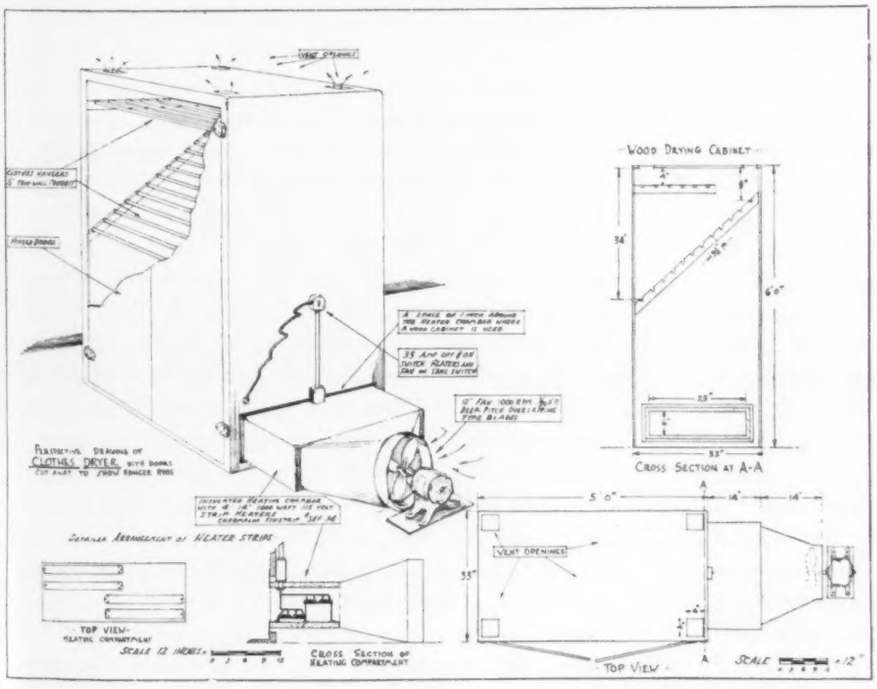
A difficulty often experienced in electrically brooding poults is that the birds refuse to come out from under the brooder to eat during the first few days. To overcome this two 15-watt lights were placed under the brooder in addition to the pilot light. All of the feed and water troughs were placed under the brooder for the first three days. At that time all-night lighting the brooder room was added and the feed hoppers and drinking fountains gradually moved out into the room.

Although Bowlby's experience indicates that 200 poults is the most satisfactory number for a single brooder, as many as 250 have been accommodated. Last year accurate data were kept on one 250-bird brood. Poults went into the brooder on May 8 and remained until June 8, or 32 days. Room temperature varied between 57 and 70 deg. F. Initial brooder temperature was 95 deg. By the twelfth day this was lowered to 90 deg. and it was progressively decreased to a minimum of 60 deg. when it was taken away entirely on the thirty-second day. Consumption initially was 18 kw.-hr. per day and this also decreased as the temperature was lowered. Total consumption for the 32 days was 279 kw.-hr. or an average of 8.7 kw.-hr. per day.

Commenting upon electric brooding, Bowlby state, "The cost of electricity to brood 250 poults varied from $4 to $5. When brooding with coal stoves, my fuel cost was over $7 for 250 poults. With the electric brooders we not only had a low loss of poults, but also a uniform bird development. We built each brooder for less than $25 and have found the forced-air brooder to be the best and most economical type of brooder that we have used."

Electric Dryer Developed For Farm Homes

After many experiments Puget Sound Power & Light Co.'s agricultural engineering department developed this electric clothes dryer for farm homes. Four 1,000-watt strip heaters and a 12-in. 1,000-r.p.m. fan were found to be capable of drying 40 lb. of wet clothes in two hours. At half heat, drying time was 5 hours. Consumption was approximately 8 kw.-hr. per batch of clothes. Construction material suggested is 3-ply ¼-in. waterproof plywood. Rods for hanging clothes are ½-in. thin-wall conduit. Exhaust air is vented to the outdoors. Total hanging length is 80 ft.



ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

McGRAW-HILL COMPANY OF CALIFORNIA
68 Post Street, San Francisco

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Union Ally

"THE ELECTRICAL business has done plenty *to* us, but this is the first time it has done anything *for* us." In making this statemen the business manager of I.B.E.W. Local No. 6 turned the spotlight on one great weakness in the electrical industry's attempt to achieve solidarity, namely the unions. He was speaking of the six-month course in lighting and wiring adequacy conducted for his membership by the PCEB, Northern Division. Ironical as it might sound, the statement was meant as a compliment, because seldom has any kind of an educational activity met with greater success.

Meetings drew an average attendance of 250 union members; ordinary meetings of the union average less than 75. The wiremen showed intense interest and enthusiasm for the subject matter presented. One of the first direct effects was the rewiring and re-lighting of the halls in which the sessions were held—this at the instigation of the membership itself. Contractors report that the wiremen now show greater interest in jobs on which they work. Actual examples of salesmanship on the part of electricians are common. In fact several jobs have already been traced directly to the instruction presented in the course.

It is safe to say that this one activity alone justifies the formation of an industry cooperative program in the San Francisco Bay region, or for that matter, anywhere else that a similar undertaking might be successfully carried out. In this era of seeming antagonism between unions and employers, it is refreshing to find such an example of harmony and real accomplishment. The I.B.E.W. can be a strong ally in all of the industry promotional activities, if only given both the inspiration and the opportunity. The example set in San Francisco is worthy of emulation in other communities.

Refrigerator Prices

NOTHING in recent times has brought the variety of comment that the drop in refrigerator prices has caused. The effects of the price reductions are not yet evident, nor will they be completely so until summer. Only then will it be known for sure whether or not the present substantial increase in volume of sales merely anticipates the summer demand and will leave that season with slim sales pickings.

Some dealers are vehemently in favor of the price drop; others are not. Some think it is a year too late; that had it come last year the mail order houses would not have made the inroads on the market that they did in 1939. Others, looking at the immediate corresponding drop in price of mail order lines, wonder if they can ever hope for somewhat near equality in price appeal with these big adversaries.

Utility men view the matter with concern. Will the manufacturers earn enough on present prices to set up proper reserves for servicing and for repair parts? If not, then the present crop of low-priced models may return to give a black eye to electric refrigeration five or ten years from now. Other utility men join dealers in wondering if retailers will long remain interested in selling refrigerators if they prove unprofitable. With reduced gross profit due to lower margins, can the dealer's normal overhead be covered and a profit made on lower priced refrigerators? Can the volume necessary for profit under such conditions be attained and maintained? Is the low-price deluge a spring freshet that will be dried up before summer comes, or will the new prices remain to establish a new and irrevocable low level of customer valuation for electric refrigeration?

These are serious and important questions. Upon their answers depends the trend of refrigerator sales in the future. Will refrigerators repeat the history of washers? If so, their day of specialty selling, strong promotion and field sales-

manship may be ended and the refrigerator relapse to a replacement market confined generally to the customers who "come and get it."

Movie Sales-Builder

IF CONFUCIUS said "one picture is worth a thousand words," one wonders how he would describe a motion picture were he alive today. The "movie" is more than a form of entertainment; today it is taking its place as an effective tool in the building of customer and public relations. Many of the utility companies are finding pictures successful goodwill builders. Examples include the Washington Water Power film, "The Story of Electric Service," which has shown to 80,000 people in that company's territory. Pacific Gas and Electric showed its series of seven superb color films to 100,000 people last year. Other companies are making wide use of educational and institutional films.

However, few have undertaken to use this medium as a definite sales-builder. The Hotpoint organization with its new full length feature film, "Blame It on Love," is pioneering in an entirely new field. Judged upon the initial showings of this excellent picture, the experiment should be eminently successful. It is estimated that between 12,000,000 and 15,000,000 people will be subjected to the strong but subtle sales message for electric cookery that is woven into the romantic story the picture tells. If this picture "clicks," and it should, a new and powerful advertising force will be available to the industry.

Dealer Programs

IN LINE with the trend, more of the utilities in the West are preparing to turn their strength to the development of dealer sales of the appliances they once sold so vigorously themselves. In 1940 almost universally the dealer programs of the utilities will be bolstered and expanded. Several power companies which formerly gave lip service to dealer cooperation while selling with unabated fervor themselves, have changed policy now. They really mean it.

Such companies are studying the cooperative plans of other utilities which long ago started such activity. Those which have completely stopped direct selling are being appraised. Those extending bonuses for dealer sales are being studied. Those that employ the combined efforts of dealers and their own sales forces in selling certain appliances are being surveyed.

Out of this new interest is certain to come a sounder program of dealer coordination. Undoubtedly those appliances still needing pioneer promotion will continue to receive the direct sales emphasis that utility selling has been able to provide.

Whatever the ideal system may prove to be, dealers will receive greater support this year than they have ever had before. Utilities are determined to see that much of the dealers' selling costs shall be reduced to the extent of the promotional and advertising expense without which electrical appliances cannot progress against the competition of other industries.

Most healthy thing about the 1940 dealer programs is that they leave the dealer with his self-respect. None of them are paternalistic; they are based upon mutual understanding and mutual benefits. This is as it should be because nothing would cause the dealer to lose his incentive and independence quicker than a lot of coddling.

Fluorescent

WHAT to do with a new light source—sell it down to cheapen, or up to levels that it is capable of producing? The industry finds history repeating itself, and fluorescent and mercury lamps bandied about between two opposite philosophies. Extremely sensitive to drops in total revenue because of rate pressures on them, the utilities are shaving their net pretty thin, and look with alarm at a general trend in curtailing of wattage from such lighting.

On the other hand the lighting industry and contractors who install will only cut off their noses to spite their faces to use fluorescent lighting only as a means to cut light bills. If that is the only sales talk they have to offer for the new light sources, they will find that this one curdles and may regurgitate. The descent to cheapness will catch them on wiring, on other equipment, on labor—and on profit too.

Nobody stands to gain anything permanently by selling fluorescent lighting short. The very quality of the light is such that to trade present low levels of illumination in order to cut wattage will leave a dissatisfied customer, one who wants more light and does not know why. On the other hand, selling up to present wattages, and thus stepping up the light output to the extent of these new sources—some twice to three times as much for the same wattage perhaps—creates satisfaction. What is more important, it develops a new level of lighting to which most everyone wants to advance but has not been able to with other means. For a long time the industry has been talking about intensities of 100 foot-candles or more as a desirable goal. With fluorescent this is attainable. But it won't be achieved with present sales tactics.

"Men and Methods"

Northwest commercial men evaluate "net building," Home Service; swaps ideas at Seattle Conference

HOME-COMING for *young* "old timers" would better describe Chairman Pat Johnson's southern-style, home-cooked Business Development Section conference of the Northwest Electric Light & Power Assn., at Seattle, Feb. 29, Mar. 1. His original version did not have the word "young" in it, but his old timers still had plenty of youth left in them—Ralph J. Cordiner, Vernon H. Moon, and A. H. Jaeger. Old timers only in that they haled from the Northwest originally, these younger executives of national businesses were the headliners on the conference program, attended by 300 people.

But they were not its sole attractions. The supporting cast was what is known as "superb" too. Still the most distinctive attribute of the conference was Pat Johnson himself, his easy-going, friendly informal way of introducing speakers, commenting on addresses given, and his conduct of the sessions and banquet. There wasn't a stuffed shirt in the entire conference, nor could there be under such disarming cordiality.

Vernon Moon, former sales manager of Pacific Power & Light Co., now a partner in Central Service Corp., of Chicago, probably made the most talked about address, on Thursday morning. Its full text may be found on pages 27 to 29. It had been a brilliant morning which his address concluded. An unusual and surprising talk by Seattle's young mayor, just renominated with almost a unanimous vote, had set forth a challenge to business to help make city governments work, for he said that democracy can only be made successful if its city administrations can be made to work honestly and efficiently.

Next had come Sam P. MacFadden, vice-president of Puget Sound Power & Light Co., who set forth his company's position in respect to condemnation and acquisition by public utility districts. Reading correspondence between commissioners and Frank McLaughlin, president of Puget Sound Co., the latter had declared that to seek negotiation while condemnation suits were held over their heads was like holding a gun under cover of olive branches.

J. E. E. Royer, vice president, The Washington Water Power Co., president of the association, after reviewing potential fields for load development, declared that the crying need of the Northwest is that of making the area attractive to new capital so that industrial expansion can be made.

Ralph J. Cordiner president of Schick Dry Shaver Co., Stamford, Conn., closed the conference with an inspiring message. From the perspective of a national viewpoint, yet with the intimate knowledge of the region from which he had come up through the ranks, Cordiner reminded the industry of its heritage of past achievement, the great men it had given to the industry, and the vision it had always held before it. It must not lose this vision, he pleaded.

Then he spoke of personal experience in a new all-electric home, and the vision of potential business this gave—3,200 kw.-hr. a month, 40,000 a year, service wiring of 3 No. 0 wires, $5,800 worth of electrical equipment and wiring. He talked too of the need for home service work. If a plant invests $1,500 per employee in machinery it gives that employee a training of two or three weeks before entrusting such machinery to him. Yet homemakers, with sometimes greater investment in domestic electric equipment, are left to train themselves and the equipment often is not used as it should be.

That a utility is always first a local business, he emphasized. Thus the local executives must be more accessible to the public. And too often, Cordiner said significantly, when an employee does an outstanding job on the outside, he is then brought into headquarters for a higher job and the effectiveness of his field work is lost. He should be given a chance to do a more effective job in his own community, yet not at his or his wife's expense.

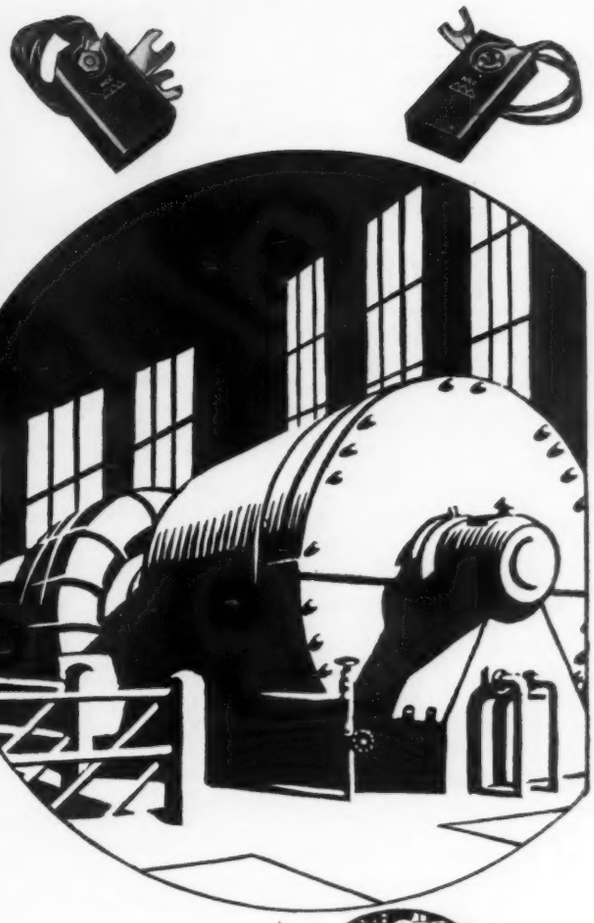
In the 1920's, Cordiner concluded, industry and business were built around *money* and *machinery*. Since then a social revolution has changed the emphasis to *men* and *methods*. He urged that the electrical industry adjust itself to this new viewpoint and develop its human side and improve its methods still further.

A. H. Jaeger, manager of the water heater division, Edison General Electric Appliance Co., Chicago, predicted a four year increase in building of homes, saying that the electric water heater was the key to the electric kitchen in new homes. "Let's not worry about the public's ability to buy," he said, pointing to its ability to buy cars even when poor. "The thing to do is to develop as much inclination to buy electrical appliances," he said, "as there is to buy cars."

Ralph Gale, sales manager, Idaho Power Co., summed up both the tangible and intangible benefits from a strong home service program, supporting his statements with an actual breakdown of costs and values. In the handling of high

CORDINER McLAUGHLIN JOHNSON ROYER

IMPROVED ECONOMY



IN POWER GENERATION AND OTHER CLASSES OF SERVICE

with

NATIONAL

TRADE-MARK

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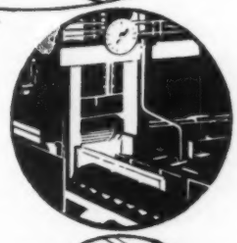


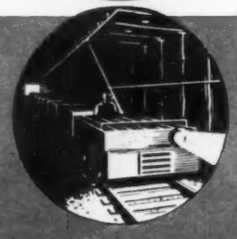
● "National" Carbon Brushes have established a reputation for economy on power generating and conversion equipment. Their performance records show lowered maintenance and repair expense, less need for attention in operation and reduced danger of expensive interruptions of service.

For heavy duty, D.C. power service the records established by SA Series Grades have set new standards of economy in performance. Our engineers, experienced in the technique of brush application, will gladly recommend the grade best adapted to your service requirements.

LET US DEMONSTRATE THE IMPROVED ECONOMY RESULTING FROM THE ADOPTION OF "NATIONAL" CARBON BRUSHES

If you are not receiving these practical bulletins on brush operation send us your name and address.

For corrosive atmospheric conditions, lead coated shunt cable will be supplied, when specified.



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Unit of Union Carbide UCC and Carbon Corporation

Carbon Sales Division, Cleveland, Ohio

General Offices: 30 East 42nd Street, New York, N. Y.

Branch Sales Offices: NEW YORK - PITTSBURGH - CHICAGO - ST. LOUIS - SAN FRANCISCO

bill complaints alone, he declared, home service women had proved far more effective than collectors. Rate reductions have come often. Higher efficiencies of appliances and high saturations have brought a need to "resell" the appliances already purchased and not used as they should be, or used improperly. The women do a most effective job not so much of load building as of load holding. In the preselling of major appliances, sales resistances have been reduced by their efforts. In the development of good and the preventing of bad public relations the girls have been likewise invaluable. But aside from these, in actual handling of calls, group contacts through classes of women, lighting demonstrations, in teaching proper use to purchasers of ranges and ironers, plus actual sales, the home service girls have more than earned their way.

The university farm department heads, F. E. Price of Oregon State and Hobart Beresford, of Univ. of Idaho, gave the conference some thought-provoking slants on power company rural electrification work. What came as a surprise to most power men, though, was a realization that the Federal government has superimposed itself upon state and county farm advisory work to such an extent that the independence of these more local and older service agencies is jeopardized. "Agriculture," said one of them wryly, "is just as much being taken over by the Federal government as the utilities."

Beresford suggested that the utilities experiment with some of the shortcuts in costs that are being talked of, such as mass distribution of appliances where a farm community is talking of group buying; meter reading by mail, letting the customer read his own meter and sending in his money at the same time.

Harry M. Carroll, manager of commercial and industrial sales, Pacific Gas and Electric Co., San Francisco, stressed the importance of paying more heed to commercial and industrial customers, of seeing that they get full benefit from any rate reductions or reclassifications, of analyzing their loads and businesses. He also touched on several pertinent problems in the commercial field, fluorescent lighting, gas engine competition, electric welding load. The value of developing business by working with groups of people, with associations, chambers of commerce, downtown merchants' committees, and similar groups, he also described.

Liaison between the Business Development Section and the Accounting and Business Practice and the Engineering and Operating Sections was nicely made by messages from both the latter sections. Ralph W. Lawlor, chairman of the accounting, and Magnus T. Crawford, vice chairman of the engineering section, told how the departments which they represent were working consciously with the sales and commercial departments to do their part.

DIERDORFF LAWLOR McALLISTER MOON McGONIGLE

Harvey Leach, advertising manager of Puget Sound, read a message from C. W. Kellogg, president of Edison Electric Institute, in which he declared that it was worthwhile to keep selling—because (1) saturation is not yet in sight, (2) sales mean growth, and growth means life to the industry, (3) the initiative of the industry is kept alive by it, (4) the public must not be let down, for it expects new miracles from electricity.

Novelties of the conference were the talk with sound and other effects, "Gadgets will get you if you don't watch out", given by W. A. Cyr, associate editor, ELECTRICAL WEST, and the newscast style used to summarize quickly the reports of the various committees that met in parallel session on Thursday afternoon. The gadget talk was one given by Cyr to dealer audiences of northwest power companies to emphasize the value of sales helps and dramatize their use. The newscasts were lightened by gentle ribbing of purported sponsors among the manufacturers. From these newscasts a still further briefing of the committee programs follows here. Since full text of the reports of these committees will appear in the June issue of ELECTRICAL WEST, only the highlights will be touched here.

Residential Sales Bureau—J. F. McAllister, Utah Power & Light Co., chairman:

Home Modernization Committee, F. M. Ingraham, Idaho Power Co. chairman, heard that: (1) "Supervision is leadership. (Guy E. Davis, Pacific Power & Light Co.) The degree of success to be attained in a utility sales campaign, assuming the plans are complete in every detail, is largely dependent upon the ability of the key men to instill in the minds and hearts of the front line members of the force an enthusiastic attitude and a determination to carry on to the best of their ability."

(2) "It is the duty of wholesale salesmen (Eric Hall of Westinghouse Supply Co., Seattle) to see that the retail salesman understands the effective use of all materials placed at his disposal by the manufacturers. It is also up to the manufacturers to use intelligent approaches to the subject of the use of sales promotion helps. The retail salesman is like the actor on the stage who stands in the spotlight. He is there for only a few moments during which time he must put on his act and get his applause—or sale."

(3) "We have organized (Larry Cheetham, Puget Sound Co.) a staff of trained specialists whose sole business it is to expand our service to electrical contractors and dealers. These specialists will work with the dealers in the same manner that our farm men work with farmers, home service representatives now work with home makers, and commercial and industrial engineers cooperate with business and industry."

(4) "To develop good and prevent bad customer relations (H. J. Merilees, B. C. Electric Ry. Co.) requires first a complete analysis of the organization from the standpoint of the customer contact departments. In this way complaints can be weeded out. Next step is to make friends. Once the point of friction is eliminated, then the job of making friends is much easier. With the point of friction well oiled the next step is to tell your story."

(5) "In the lives of the average family (R. B. McElroy, Washington Water Power Co.) hot water service should be classed as a necessity. However, a broad demand for hot water service has not been created, either by utilities or manufacturers and the lack of customer acceptance has made the dealer steer away from the sale of electric water heaters. There is no other residential service that has such potential for increasing kw.-hr. consumption in the home. Therefore the small percentage of residential customers who install water heaters bring up residential consumption and revenue very rapidly."

(5) "Dealers need sales training so they can remain in existence and enjoy a profitable business. (L. F. Dickman, Edison General Electric Appliance Co.) The distributor should furnish and outline for the dealer proved sales plans, showing him how to develop next year's purchaser this year."

Home Service Committee, J. B. Buman, Northwestern Electric Co., chairman, heard this said of the value of this work:

(1) "Since even mediocre lighting is better than no lighting at all (Walter Potter, Incandescent Lamp Dept., G-E) an important job is to get all electric customers to want lighting badly enough to use the lamps they now have and keep the sockets filled with lamps large enough to produce a larger measure of adequate lighting. When you sell a range the buyer is not likely a prospect for an additional range, but when you improve the lighting in just one spot you instill the desire for more lighting throughout."

(2) "Home service teaches present and future homemakers by shaping and guiding their thinking, by sowing the seeds of desire for better living through the fullest use of utility services. Such desire is developed through continuous 'showing how' to groups as well as to individual contacts."

"It's the only switch insulator that looks as though it were built for the job."

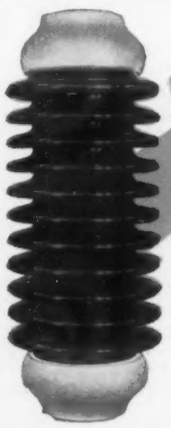
"I've been reading a lot recently about functional design. Seems as though a thing built to do a job right, looks right.

"That certainly applies to a thing like a switch insulator. The way I look at it, a switch insulator first has to *insulate*. And that brings in a lot of things like continuing to insulate under dirt conditions, mechanical attack, power arcover, temperature changes. Besides, it must be strong and rigid to take a lot of beatings and still stay in line.

"You take this conventional unit. Why all those broad, fragile shells? And why nest them together? It's bound to be relatively weak, and under temperature change, some real strains must be set up. And if it's supposed to *insulate*, why that steel pin running right up through it? An inch and a half of porcelain from conductor to ground seems needlessly skimpy.

"Now compare that with this Station Post. Here's an insulator that takes into account the conditions it will have to meet. Here's a tall one-piece body, porcelain all the way from cap to base. Short sturdy petticoats to stand up under arcover and mechanical attack. Longer, uniform leakage distance for dirt operation. And it is certainly more rigid.

"It *looks* right and our service records certainly show that it *performs* right."



SPECIFY STATION POSTS.. IT'S MODERN CONSTRUCTION

For a sensible explanation of Station Post advantages, see pages 62-65 of the new Lapp catalog. If you're lacking a copy, let us know; it will come by return mail.

LAPP INSULATORS

LAPP INSULATOR CO., INC.....LEROY, N. Y., U. S. A.

(3) "Home service cannot accomplish its basic individual objectives if its major effort is directed toward attempting to close sales."

(4) "Home service departments should—Know the customers and what they want before planning any activity; work with all sales allies; maintain adequate records to prove their worth; provide careful supervision and direction; sell all services and uses."

(5) "A home service advisor must: Have good health, be pleasing in manner and appearance, be sympathetic, be confident of self and work, have ability to share customer's difficulties, be willing in attitude at all times, be adaptive to all conditions, be a keen judge of human nature, have a pleasant speaking voice, have a desire to meet people, create a favorable impression and have a stable background."

Rural Sales Bureau, J. C. Scott, Puget Sound, chairman.

C. O. Bunnell, Pacific Power & Light Co., reviewed the reports from member companies as to the organization and personnel of farm electrification departments and their objectives.

W. R. Newmyer, Portland General Electric Co., told of an analysis of 50 farm accounts in the Williamette valley to spot check the load increases, decreases and the changes in numbers of connections. Increases among 32 of the 50 were sufficient to bring the average for all up for the year.

Charles Wildebour, Puget Sound, said that experience had justified its farm laboratory. Often manufacturers of farm equipment are small local concerns unable to do research and thus the laboratory serves both customers and local industry.

Commercial and Industrial Sales Bureau, J. A. Lockhart, Pacific Power & Light, chairman.

Orland C. Mayer, Idaho Power, gave a commentary on the sales training questionnaire answers sent in by 10 major companies. Each favored the continuation of the annual cooking conference. Likewise he tabulated what these companies suggested as requirements in a sales training program. The basic methods of sales training now being used were summarized.

Hilbert S. Johnson, talking of fluorescent lighting, defined the problems as (1) correcting misstatements of unethical selling, (2) finding proper equipment for specific applications, (3) selling proper levels of illumination because of high cost of equipment. Possibilities he listed as: (1) new and more efficient light sources, (2) development of proper equipment, (3) higher illumination levels, (4) better load factor, (5) more load and more revenue.

M. R. Lund, Washington Water Power, described the preliminary results of a campaign now in progress selling adaptor types of units to commercial lighting customers using less than 50 kw.-hr. per month.

C. T. Bakeman, Puget Sound, reported the results tabulated from a survey of commercial and industrial lighting programs of 14 utilities. When published in ELECTRICAL WEST in June it will provide a comparison basis for (1) commercial customers per salesman, (2) load added per customer, (3) load added per salesman, (4) estimated revenue per kilowatt.

Advertising Bureau, John Dierdorff, Northwestern Electric Co., chairman.

The most effective advertising programs carried on by each of the utilities was reviewed and discussed. Important new ideas, changes or redirection of policy or emphasis included: Idaho Power (Gilbert L. Stanton) has found a way to give its advertising and sales executives more free time to plan by longer range programs. Puget Sound (Harvey Leach) has managed to get personality into its institutional program in such a way as to appeal successively to a wide range of interest among customers and public. Pacific Power & Light (M. G. Kennedy), has found that institutional copy can't be mixed with sales or use copy. It now prints illustrated leaflets telling the institutional story for personal distribution.

"How do you get into a war?" asked the ad men when James Lightbody said that since Canada entered the war the B. C. Electric Railway Co. has had no institutional problem. Humor has been the outstanding characteristic of B. C. Electric ads. Portland General Electric Co., (Ralph Millsap), conducted a "nudist" dealer salesmen's contest, starting with a G-string, and gradually clothing the salesman as he made each sale. The company is pleased too, said Millsap, with its advertising allowance to dealers, which must be matched by dealers. Washington Water Power (Harvey A. Brazzard, Syverson-Kelly Agency) had a successful quiz contest campaign, requiring a call to a dealer store for entry blank.

"A pipeful of tobacco costs only half a cent—but that is more than enough to toast so many slices of bread at Northwestern Electric's very low rates", was used as a type of appeal by that company. (John Dierdorff) Odd reaction was that customers of Portland G-E Co., operating in the same territory, often had to be talked out of the idea they paid higher rates than charged by Northwestern. Utah Power & Light (M. L. Cummings) coordinated the sales staff and its employees with prospects for its successful "Up we go" campaign. Through the Electrical League of Utah a special aluminum utensil offer made sales for dealers.

The banquet, Thursday night, gathered together seven past presidents of the association which was organized in Seattle in 1908. Frank J. McLaughlin, president, Puget Sound Power & Light, presided and gave a strong address on the challenge of public ownership to the initiative and courage of private companies and their people.

PCEA Convention Designed

With the selection of committee chairmen, plans have begun to take definite shape for the PCEA annual convention to be held at Oakland, Calif., May 22-24. Headquarters will be the Hotel Oakland, although general sessions will be held in the City Club Theater.

Opening event will be a general session on Wednesday morning, followed by parallel sessions of the Operating Economics, Business Development and Administrative Services sections in the afternoon. These group meetings will continue Thursday morning with a second general session that afternoon. The final general session will be Friday morning.

Entertainment features will include special motion pictures and a bridge tournament Thursday evening, a golf tournament Friday afternoon and a cocktail party, banquet and ball Friday night.

General convention chairman H. Q. Noack of Hubbard & Co. has announced the following chairmen for the convention:

I. W. Borda, Okonite Co., program chairman.

F. H. Woodward, Pacific Gas and Electric Co., program manager.

Al C. Joy, Pacific Gas and Electric Co., publicity chairman.

George C. Tenney, ELECTRICAL WEST, attendance chairman.

Arthur Dahl, General Electric Supply Corp., banquet chairman.

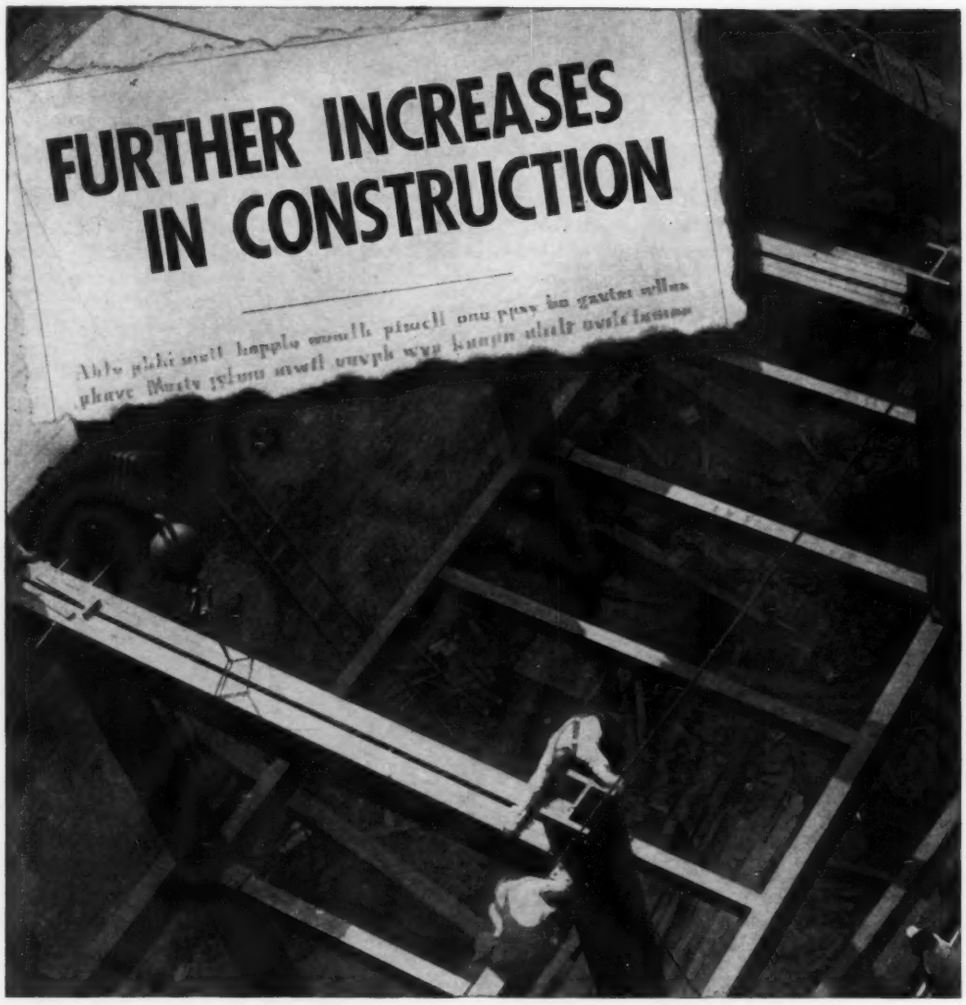
Frank Boyd, Pacific Electric Motor Co., golf chairman.

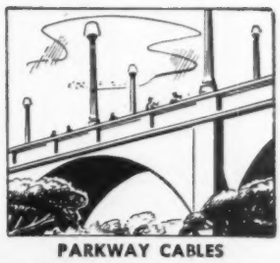
L. F. Galbraith, Pacific Gas and Electric Co., hotel chairman.

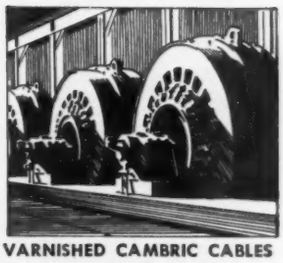
Fred Mulvaney, Maydwell & Hartzell, Inc., ladies' entertainment chairman.

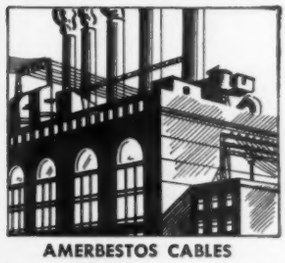
J. P. Carson, Graybar Electric Co., reception chairman.

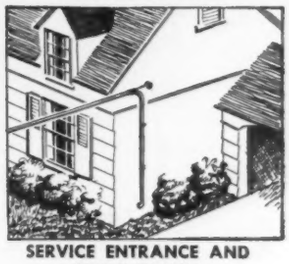
PCEA President W. W. Glosser and General Convention Chairman H. Q. Noack

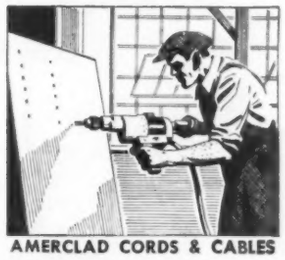


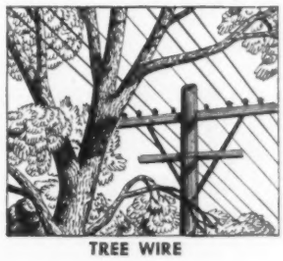

PARKWAY CABLES


VARNISHED CAMBRIC CABLES


AMERBESTOS CABLES


SERVICE ENTRANCE AND DROP CABLES


AMERCLAD CORDS & CABLES


TREE WIRE

. . . *and More Satisfied Users of* AMARINE-*30*

AMARINE-30 building wires and cables with braided coverings are approved by Underwriters' Laboratories for installation underground; in concrete slabs or other masonry in direct contact with earth; in permanently moist locations; and where the condensation and accumulation of moisture within the raceway are likely to occur. Ordinarily, installations of these types would call for the use of lead-sheathed cables. Wherever such conditions exist AMARINE-30 can be employed safely and at worthwhile savings.

Other outstanding building wires of the highest quality are:

Americore (Code)
Amerite (30% Performance)
Amperox (Heat-Resistant)

All of these products are manufactured by the American Steel & Wire Company and are made under rigid supervision. Superior quality and satisfactory service have made them the choice of the building industry. Write for data.

ADEQUATE WIRING SERVES AND SAVES

COLUMBIA STEEL COMPANY, *San Francisco, Pacific Coast Distributors of Electrical Cords & Cables*
Manufactured by
AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
United States Steel Export Company, New York

UNITED STATES STEEL

M. S. Barnes, General Electric Co., registration chairman.
W. P. L'Hommedieu, Westinghouse Elec. & Mfg. Co., transportation chairman.
Frank Angle, Allis-Chalmers Mfg. Co., cocktail party chairman.

Program variety will be provided by a judicious mixing of speakers and visual demonstrations according to general chairman Noack. The City Club Theater, in close proximity to the Hotel Oakland, lends itself to such a combination.

Several features for the program have already been scheduled. President W. W. Glosser will be the opening speaker. Others included on the first general session program include Frank McLaughlin, president, Puget Sound Power & Light Co., and C. W. Kellogg, president, Edison Electric Institute. A general luncheon will also be held Wednesday noon with an outstanding speaker as the feature.

Heading the Thursday afternoon general session program will be a pre-view demonstration of the G-E House of Magic equipment which will be a part of that company's exhibit at the G.G.I.E. Included on the Friday morning general session will be a demonstration by the Pacific Telephone and Telegraph Co., and an address by M. O. Troy, vice-president, General Electric Co., Schenectady. Complete program details will be published in the May issue.

Scheduling of the convention for May 22-24 has an added advantage for those members not residing in the San Francisco Bay area. The 1940 G.G.I.E. will open its gates on Treasure Island on May 25, thus affording those attending to spend the days following the convention at the fair.

Maintenance

Executive committee members recently elected by the Electrical Maintenance Engineers Assn. of southern California, are R. Glenn Woods, National Biscuit Co.; Glenn Farr, RKO Studios, Inc.; Jerry W. Ellis, Knudson Creamery Co.; Walter P. Ritter, American Can Co.; Warren W. Starkey, E. K. Wood Lumber Co.; Howard C. Park, General Motors Corp.; Jerry S. Jacobs, City of Long Beach; Harold J. Hutt, Pacific Coast Borax Co. and Samuel J. Lindsay, Wilshire Oil Co.

Committee chairmen selected were Walter P. Ritter, editorial; Samuel J. Lindsay, educational; Warren W. Starkey, membership; Glenn Farr, program; Jerry W. Ellis, social; Howard C. Park, dope sheets; Jerry S. Jacobs, liaison and Harold J. Hutt, committeeman-at-large.

● San Francisco maintenance men have just organized an EMEA.

Inland Empire

Beginning a second year, the Inland Empire Electrical Equipment Assn., in a series of meetings in late February, elected new officers for 1940. As organized the association elects officers in each of its divisions to conduct the affairs of the organization in that division with a general secretary in Spokane. Meetings were held at Spokane, Pullman, Omak, Washington, and Lewiston, Idaho. Following the election, W. A. Cyr Associate Editor of Electrical West, presented a dramatized sales story on the use of sales helps.

Top—Claude Edgren, president, Pullman association; center—Bev Wilson, Okanogan, new president, and C. F. Schaeffer, Omak, retiring president, Okanogan unit; bottom — retiring president Toms, secretary Gordon De Foe, new president H. E. Karlburg, of the Lewiston Assn.

The Spokane meeting was presided over by Charles Hebbard, Tull and Gibbs, president during 1939. Kinsey Robinson, president of Washington Water Power Co., was also asked to talk on the value of coordinated activity by the entire electrical industry. Lewis A. Lewis, asst. gen. mgr. WWP spoke too.

Officers elected at Spokane were: president, R. C. Nelson, general manager, Palace Department Store; vice-president Alvin Jensen, Jensen-Byrd Co., distributors; secretary, A. H. Wegner, Washington Water Power Co. division sales manager; treasurer, V. J. Morris, V. J. Morris Co.; and directors, Chas. Hebbard, Tull & Gibbs Co.; Eric Johnston, Brown-Johnston Electric Co.; Dave Knapp, Great West Fuel Co.; E. S. Bergquist, Washington Electric Appliance Co.; R. L. Shahan, general manager, Sears-Roebuck store; Harry A. Dunlap, manager Westinghouse Electric Supply Co.

The Pullman, Wash., meeting was presided over by J. D. Lewis, division manager. Claude Edgren, proprietor of Elk Drug Store and Colfax Electric Co. at Colfax, was elected president; Lester Stuart, Moscow Electric Co., Moscow, Idaho, vice-president; Joe Fox, Washington Water Power Co. sales manager, secretary-treasurer; and directors Eldon Stom, Stom Electric Co., Troy, Idaho; Chas. Blickendeafer, of Farmington, Wash.; Joe McCrosky, St. John, Wash.; F. E. Ettlich, Rosalia, Wash.; J. E. Trimble, Garfield, Wash.; J. W. Williamson, Palouse, Wash.; Sam Fountain, The Gamble Store, Tekoa, Wash.; Carl Simmons, Westinghouse Store, Genesee, Idaho; Dallas Hill, Pullman, Wash.; Ted Bell, La Crosse, Wash.; and Webb M. Bragan, Oaksdale, Wash.

In Lewiston the officers elected were: president, H. E. Karlburg, Montgomery Ward & Co., Lewiston; vice president, Bob Oud, Orofino Hardware Co., Orofino; secretary treasurer, Gordon F. De Foe, division sale manager, WWP.

At a subsequent meeting in Davenport, the Big Bend division of the association elected as president William Thiel, general manager, Ritzville Trading Co., Ritzville; vice president, Paul Erickson, sales manager, Radio Electric Co., Wilbur, and secretary treasurer, Fred J. Williams, WWP.

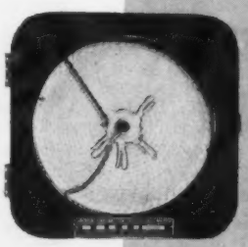
For the Okanogan territory, the meeting was presided over by C. F. Schaeffer, electrical contractor, president in 1939. The meeting was held at Omak. Elected to office were: president, W. Bev Wilson, Okanogan; vice president, D. C. George, Oroville; secretary-treasurer, Earl Belknap, Washington Water Power Co. division sales manager, Okanogan; and to the Board, Irvin Schultz of Loomis; Sam Albright, Okanogan; C. B. Norris, Chelan; J. H. Colbert, Tonasket; J. W. Geissler, Brewster; and Henry J. Peters, Twisp, Wash.

Each of the groups elected R. B. McElroy, general sales manager, WWP, as general secretary in Spokane.

LOAD CONDITIONS ON STATION AND FEEDER EQUIPMENT..

... visible at a glance with

LINCOLN AMPERE DEMAND METERS



TYPE CCA GRAPHIC

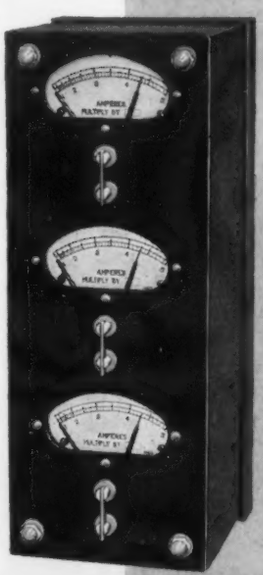
Gives a continuous single line record of ampere demand even on the most fluctuating loads.

All the indicating meters illustrated below can be supplied with self-contained instantaneous indicators.

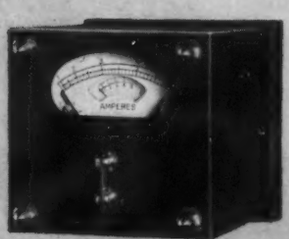
WHEN ampere demand is measured, on station feeders, with Lincoln Indicating Ampere Demand Meters, two pointers give the most important information regarding loading conditions. The maximum pointer tells at a glance the maximum demand since the pointer was last reset manually. The other pointer indicates the average load during the immediately elapsed 30 minutes.

These meters operate like an ordinary indicating ammeter except that their response to load is highly time lagged. Their response to load follows the typical heating curve of distribution equipment, the indications depending upon the heating effect of the load. With their rugged construction and highly damped action, Lincoln Meters have no equal in low maintenance.

Write for details of this practical and economical method of determining the load conditions of station and feeder equipment.



TYPE 3-ADV, TRIPLEX STYLE



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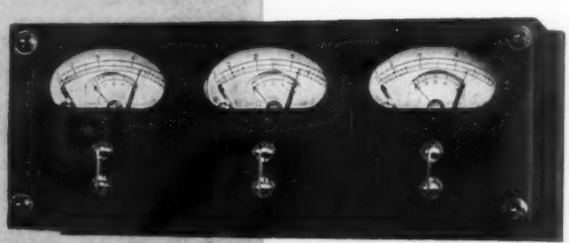


TYPE 3-ADHW, TRIPLEX STYLE

LINCOLN METER DIVISION
SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

British Columbia

Electric Railway Co. stages remarkable dinner

Approximately 700 representatives of the electrical appliances and allied industries and gas appliance retailers and associates recently assembled at the Hotel Vancouver, Vancouver, B. C., for the annual dinner sponsored by the British Columbia Electric Railway Co. The event was declared to be without equal in the history of the gas and electric industries in the Dominion for attendance and enthusiasm and co-operative spirit.

W. C. Mainwaring, merchandising head of the B. C. Electric, was chairman, and W. G. Murrin, president of the company, extended an address of welcome. E. H. Adams, vice-president and comptroller, pointed out that in the lower mainland area of B. C., there were over 91,000 users of electrical domestic energy with an average bill for light and power, including power for general farm purposes, of less than 7c per day, or $2 per month, or $25 per year.

Real competition comes from without the electric and gas appliance industry, and not from between those engaged in it, W. Holt Gurney, president of the Gurney Foundry Co., Toronto, told the gathering. He pointed out that the automobile dealer, the silk stocking salesman, the florist, the travel promoter, and in short, anyone who sold anything that could be classified as a luxury and which did not contribute towards furnishing of the home, provided the real competition confronting appliances sales.

These competitors, he asserted, were making the man with a limited margin, after paying for necessities of life, choose between appliances and other things. Few people could afford everything, and when they were sold on new cars and on travel they had to economize somewhere so their buying power in home appliances was temporary impaired. He urged this audience to more aggressive competition to other industries and greater cooperation of effort within their own industry.

The concluding item was a Cavalcade of Progress, in which great originality was displayed in the presentation of all aspects of the sales program of the industry for the coming year. Slides were shown with photographs of appliances, installations of electrical equipment, and leading figures in all branches of the industry, many of the latter delivering an address to the gathering over the loud speaker system of the hotel while their photograph was on the screen, and thus giving the effect of a sound film of the entire presentation.

K. Miller, T. Eaton Co., won the attendance prize, a handsome stand lamp. Senior executives of public utility companies from Edmonton, Seattle, and Victoria were guests with Dr. W. A. Carrothers, chairman of the B. C. Public Utilities Commission.

Contractors

Northern Calif. Association to meet at Stockton

Stockton, Calif., will be the meeting place of the Electrical Contractors' Assn. of Northern California, April 20, for the annual meeting and election of officers. Ken Ryals, Stone-Ryals Electric and Mfg. Co., San Francisco, president of the association, declared that the program will consist of discussion of recent California state license cases, any new developments in the Federal investigation of the building industry, sales policies in relation to construction materials and the 1940 edition of the National Electric Code. R. Goold, Eddy Electric Co., Stockton, and vice-president of the association, is in charge of local arrangements.

Agenda

Western associations continue programs with vim and vigor

Extra-curricular activity in the electric industry is carried on by numerous leagues and clubs throughout the West. This month their secretaries report as follows:

AIEE—Vancouver section—Students' night was held Feb. 26. H. H. Henline, national secretary, was present to hear papers by G. Griffiths, A. R. Hailey, J. Cosar and E. Webb.

AIEE—New York headquarters—The Pacific Coast convention dates have been set for Aug. 26-30 in Los Angeles, Calif.

Electrical Estimators, Los Angeles—Met March 7 Chamber of Commerce Bldg. to hear Mr. Manahan. J. Strickley is secretary of this group. Met March 21 for program arranged by Electrical Development League of southern California. Joe Rose was chairman of the day.

EMEA—Southern California chapter—Meeting on March 19th featured program by Dean T. Smith, supervisor of public activities for Southern California Telephone Co. "In Other Tongues," he discussed the speech frequency inverter. R. Glen Woods is president of the organization.

IAEI—southern California chapter—Met March 27 to discuss inspector problems.

IES—southern California section—Speakers at March 12th meeting were Charles D. Gibson who discussed "Educational Lighting," and Dr. Willis M. Gardner, whose subject was "An M. D. Looks at School Lighting." The Study Club presented features by A. R. Slimmon, and Urban Beh.

NECA—Los Angeles chapter—Meetings were held March 11 and April 8 to discuss general business.

NECA—Santa Barbara chapter—Meetings were held March 14 and 28. At the first session, Arthur Kempston of Electrical Development League of southern California spoke to the group on sales work and plans to increase industry sales.

Pasadena Electrical Contractors Exchange—Meetings held every 2d Wednesday in month. Purpose of get-togethers is applied training.

Rocky Mt. Electrical League—Dr. George W. Allison addressed electrical contractors in Denver on March 4 at a meeting arranged by the Adequate Wiring Bureau. Four other meetings at which Dr. Allison spoke were held at the Pueblo, Greeley, Rawlins and Casper chapters. Greeley is sponsoring a three-day electrical Exposition, March 18-20. Engineering and accounting section of the League will hold spring conferences April 15, 16. H. E. Samson is president of the League.

Electric Club of San Diego—Met March 19 to hear Major General C. H. Lyman, U. S. Marine Corps, give the "Facts about China." Chairman of the day was Roger S. Ruffin, San Diego Consolidated Gas & Electric Co.

San Francisco Electrical Development League—Regular luncheon meeting, March 4, Olympic Club Glee club gave a concert. Ken Ryals, new president of the League, is a member of the club.

Electric Club of Washington—Met March 4, with E. G. S. Pryor, resident engineer for Underwriters' Laboratories. Pryor showed a film prepared by the public relations committee of AIEE called "Preventing Fires Through Electrical Safety." On March 18, a St. Patrick's Day program was held and led by James H. Hodson.

IAEI, Salt Lake City—Frank Young, Sales Manager of Apparatus and Merchandise for Westinghouse Electric Supply Co.'s Salt Lake branch, spoke before members of the local chapter of Inspectors Feb. 6 on "Motor Protective Devices and Motor Branch Circuit Protection." Members also saw the Westinghouse color film, "Middleton Family." Scheduled to speak on Feb. 20 was J. Hyde Stayner, Supt. of Utah Power & Light Co. meter dept. and an Adequate Wiring expert.

● COMMITTEES SELECTED at a recent Electrical League of Utah Board of Trustees meeting to guide the organization's activities through its 20th year were: Chas. F. Wiggs, chairman of the Membership Committee, Will O. Smith, W. C. Hollingworth, Jack C. Jacobs and Fred Schoss; Activities Committee: Paul J. Devine, chairman, J. F. McAllister, John Longden, Lawrence F. Thompson, Roy Kimberlin; Program Committee: Ora H. Barlow, chairman, J. Vernon Sharp and Dan Hutchinson. To continue the successful work that it has already started, the Adequate Wiring Committee, selected last year, was unanimously elected to continue through 1940. L. B. Johnson is chairman and other members include W. R. Hancock, A. P. Farr, Blaine Grey, M. J. Kynaston, C. A. Wolfrom and M. E. Dansie.

FILLING EMPTY SOCKETS !

WHAT ARE THESE 28 GIRLS DOING FOR YOU ?

THE twenty-eight girls in the picture below are members of Phil Spitalny's All-Girl Orchestra. Every Sunday evening at 10 o'clock (EST) they go on the air in the "G-E MAZDA Lamp Hour of Charm" to sell Better Light for Better Sight. This program reaches more than 3,000,000 families—many of them your customers—telling them about the low prices and high quality of G-E MAZDA lamps . . . and urging them to use better light for better seeing. By helping to keep empty sockets filled, this program helps sell lighting for you! You can profit by inviting your customers to hear it every Sunday evening.

G-E MAZDA LAMPS

GENERAL ELECTRIC

Phil Spitalny's talented and lovely All-Girl Orchestra has made the "G-E MAZDA Lamp Hour of Charm" one of the most popular musical shows on the air. Sunday, NBC Red network, 10:00 P.M., EST.

NEWS OF THE INDUSTRY

ATTORNEY GENERAL CITES RULING ON PUD TAX FUNDS

In a recent ruling at Olympia, Wash., Attorney General G. W. Hamilton informed State Auditor Cliffe Yelle that public utility districts cannot use tax funds for the purpose of operating a public utility information service to educate the voters on PUD matters. The attorney general said the statutes and laws of the state do not confer on public utility districts the right to "pay out monies from an annual tax levy for the purpose of obtaining, printing and distributing general educational information to the public."

The state auditor had been asked by Frank M. Stocking, secretary of the Thurston County PUD No. 1, whether or not funds could be used for such a purpose. The information was to have been obtained and distributed through the public utility districts information service with offices in Seattle, "to see that the public gets all the information and facts necessary for carrying out an effective program."

Hamilton said the law allowed them to get out such information themselves, but they could not contribute to the state association of utility commissioners. The Supreme Court held recently that county commissioners could use tax money to finance their private association because the legislature had recognized the association as official.

PUD GROUP UNITED ON PUGET SOUND CONDEMNATION

Dispute in the ranks of the Public Utilities District Commissioners' Association, organized by commissioners of ten county-wide public utility districts, over the methods to be used in acquiring the holdings of the Puget Sound Power & Light Co., has finally been settled, with two opposing groups within the organization reunited and pledged to work in harmony.

The recently created Consumers Non-Profit Public Power Corp., composed of eight PUD commissioners who "bolted" from the original group, and who formed their association with a plan of outright purchase of the power company's holdings, was charged with making an arrangement with Guy C. Myers, New York promoter and financial agent, which, if consummated would mean commissions totaling several million dollars. In fact, A. G. Ziebell, president of the original PUD association, declared that the incorporation of Non-Profit group was arranged and paid for by Myers, and that under such a financial arrangement, the bonds issued would be sold at private sale to the banking syndicate which he represents, instead of being sold through public bidding at public sale. Such an arrangement, he pointed out, would close the door to Government RFC financing or competitive bidding by other bond houses.

Under the new united arrangement, however, any negotiations which Myers might make will be subject to approval of the entire association. It is learned that the commissioners' group is considering the policy advocated by the cooperative—that is, possibility of negotiating for the outright purchase of the power company's properties rather than by acquiring them piece-meal through separate PUD districts. However, the commissioners state that such transactions would not be conducted through a syndicate, but by negotiators employed by the PUD commissioners on a strictly non-profit basis.

BLACKOUT?

Forty residents of Fraser have asked the Colorado State Public Utilities Commission to find out why their electric light bulbs burn out. According to E. E. Wheeler, chairman of the commission, a petition has been signed against the service of the Grand County Heat, Light & Power Co.

Customers contend that service is irregular and uncertain, that it burns out electric light globes and radio tubes. A formal hearing of complaints is to be held. In addition to Fraser, Grand County serves Winter Park, Granby and Hot Sulphur Springs.

● AVERAGE DAILY PRODUCTION of electric energy reached an all-time high for the fifth consecutive month during January, 1940, according to a Federal Power Commission report. A total of 12,000,096,000 kw.-hrs., or a daily average of 387,100,000 kw.-hrs. was produced for public use. Production by water power amounted to 26% of the total output for public use. Reports received during February, indicating generating capacity in service in the United States on Jan. 31, totalled 40,367,000 kw.

S. F. CONTRACTORS GET INDICTMENT WITHDRAWAL

Filing of a demurrer ten days before its scheduled appearance of March 7, the San Francisco Electrical Contractors' Assn. caused the Department of Justice to withdraw its previous indictment and to summon the Grand Jury and ask for a re-indictment in a revised form. Hearing has been set for April 10. No new bonds were required and although the same persons were re-indicted, contractors' counsel, Walter J. Walsh, feels that the new indictment indicates a weakness in the Federal government's position in respect to the case. The demurrer maintained that the Federal courts were without jurisdiction in attempting to prohibit the contractors from conducting their business under the state laws of California.

New Indictment Resembles Old

The new indictment is identical with the old one except for the terminology of the charges against the contractors. In the new indictment, the charges are broken down into four separate counts; namely, that the contractors have unlawfully conspired to fix and control bids, eliminate the contractors who refuse to participate, increase the cost of the electrical installation and thus, fourth, restricted the volume of electrical equipment shipped into the San Francisco Bay area. The latter count is the only one upon which the case can legitimately rest.

In an endeavor to make its case stronger, the following interpretation of how interstate commerce is affected is written into the indictment.

"While electrical equipment is in the hands of wholesalers it is not processed, said wholesalers acting as instrumentalities by which equipment is delivered to electrical contractors in the San Francisco bay area. The equipment does not come to rest within the state at any time prior to its use by electrical contractors in the installation, alteration or repair of electrical systems."

While the court procedure and legal fees are exceedingly costly, the officials of the Contractors' association declare they intend to see the thing through because they believe their operations to be legal and in the public interest.

While fines have been given in other areas recently the San Francisco group asserts that its methods are completely dissimilar and designed under California law, hence exempt.

A Program that Ends with a BANG!

Abnormal pressure destroyed this lead sheath. Internal pressure tests show weaknesses that can be corrected.

Methods followed in cable sheath research start at the microscope; end in the high pressure room!

FOR many years now, Anaconda engineers have been aiming at perfection by applying the results of research to improve lead cable sheaths.

In addition to our exhaustive microscopic, physical and chemical tests on lead, huge test samples of lead sheath weighing close to one ton are prepared and subjected to both high and low internal pressures. The effect of stop marks, welds, eccentricity and other manufacturing variations are observed. The factor that proves weakest under this variation of stresses is soon found and corrected so that in service almost any extraordinary condition can be met with a wide margin of safety. In applied research of this kind is the origination of your guarantee that wires and cables bearing the Anaconda trademark are of the highest quality. 40860

ANACONDA
from mine to consumer

Burst tests on full charges of lead sheath.

USE MODERN IMPROVED **Anaconda Wire & Cable**

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York City; Chicago Office: 20 North Wacker Drive
Subsidiary of Anaconda Copper Mining Company. Sales Offices in Principal Cities

Additional Domestic Rate Cuts Filed In Oregon

Additional reductions in domestic rates for Portland and surrounding territory were filed with the Oregon Public Utilities Commissioner by Portland General Electric Co. and Northwestern Electric Co., March 15. This cut, amounting to $120,000, added to the cut put into effect in December, 1939, brings the total reduction for about 155,000 residential customers of the two companies to over $800,000.

A reduction in commercial schedules for commercial and industrial lighting and small power was filed by the two companies March 16, and became effective March 25. These rates will effect savings of about $632,000 for the 20,000 commercial customers of the two companies. Of this amount, $225,000 will go to customers of Northwestern Electric Co. and $407,000 to Portland General Electric customers.

The new domestic schedule offers 50 kw.-hr. at 3.5c, 75 at 2.5c, 100 at 1.5c, 900 at 0.7 with the excess at 1c. The commercial lighting schedule for demands of 5 kw. or less is 200 kw.-hr. at 3.5c, 300 at 3c, 500 at 2.3c with excess at 1.4c. Demands above 5 kw. will be measured and the rates for these larger demands will be on a demand basis.

McLaughlin States Puget Sound's PUD Stand

In a statement by Frank McLaughlin, president, Puget Sound Power & Light Co. has outlined four conditions under which it will be willing to cooperate in negotiations for the acquisition of its properties by Public Utility Districts of Washington. The statement followed announcement that a committee of the Public Utility District officers will seek a conference to discuss negotiations for the purchase of the company's power system. McLaughlin reiterated a statement which he had made in a letter to the PUDS in 1938, in which he said:

"If the Public Utility District Commissioners wish to deal with the matter of the acquisition of the company's entire electrical properties and business by negotiation and will set forth some definite plan to that end, and will, pending the outcome of such negotiations, withdraw existing condemnation suits and defer the filing of any further suits, the company will fully co-operate, for the purpose of appropriate studies and discussion, and furnish such facts and figures as may be necessary."

McLaughlin states that his company has not received any such definite proposal, backed with evidence of ability to perform, nor have any of the condemnation suits been withdrawn. He declares the position of the company today is the same as it was when the above-quoted letter was written. He also states: "it is pertinent to report that over 50% of the company's electric income comes from territory in which there are no public utility districts."

McLaughlin said it would be definitely contrary to the public interest to tear apart the company's integrated and inter-connected power system, which has been built up over a period of fifty years, through putting together some 148 individual companies.

Public Utility District commissioners, meeting in Seattle recently appointed a committee to confer with McLaughlin to institute negotiations for the acquisition of the company's properties by the districts. Members of the committee are: A. G. Ziebell, Marysville, president of the Puget Sound Utility Commissioners' Assn.; George Marshall, Tenino, secretary, and Chester A. Bundy, Wenatchee. At the meeting, members of the association also discussed proposals to sell PUD revenue bonds at open, competitive sale, and reinstatement of contracts with Guy C. Meyers of New York City to act as fiscal agent in purchase of utility properties.

Marks Resigns At Bonneville

Herbert S. Marks, general counsel of the Bonneville Power Administration, submitted his resignation last month to Administrator Paul J. Raver. He left the Project April 1 to engage in the private practice of law.

Marks came to the Bonneville Power Administration early last summer at the request of the Secretary of the Interior and James L. Fly, former acting general counsel, who was elevated to the chairmanship of the Federal Communications Commission.

Prior to his appointment to Bonneville, Marks was assistant general counsel of the Tennessee Valley Authority where for five years he took an active part in handling constitutional litigation which resulted in a United States Supreme Court decision upholding the validity of the Authority.

Immediately following his arrival in the Northwest, Marks instituted proceedings, which accelerated the contracts and land program of the Bonneville Power Administration. He was active in facilitating the execution of the contract with the Aluminum Company of America, first major metallurgical industry to be attracted to the Pacific Northwest as the result of the federal government's power development program on the Columbia river.

Washington PUD Buys West Coast Power Lines

Wahkiakum County last month became the fourth public utility district in Washington to acquire its own electric power system, when it purchased the local lines of the West Coast Power Co. for $120,000. At the same time Pacific Public Utility District bought three of the company's generating plants and the balance of its distribution lines for $300,000.

Both of these districts will be served with power from Bonneville Dam as soon as transmission lines to Raymond are completed.

As a result of the transfer the Wahkiakum district will begin serving power users in Skamokowa, Cathlamet, Puget Island and other communities in the county. Commissioners of the Wahkiakum utility district announced they would retain all employees of the company and that an immediate pay increase of 15% would be authorized. Pacific public utility district also is planning salary adjustments. The latter district will extend its power operations to Naselle Junction, Ilwaco, South Bend, Long Beach and other adjoining communities.

Until completion of the Bonneville Administration transmission line to Raymond next summer, both districts will continue to receive power from the four generating plants they have just purchased. This supply will be augmented by a short term power contract with the Westport Lumber mill. The Pacific district has contracted for 1,500 kw. of Bonneville power, and Wahkiakum has arranged for an initial supply of 400 kw. of primary power.

The Bonneville Administration has agreed to resell a portion of the West Coast transmission line to the Pacific PUD for $33,750 as soon as plans are approved for construction of a heavier power circuit along the same right-of-way.

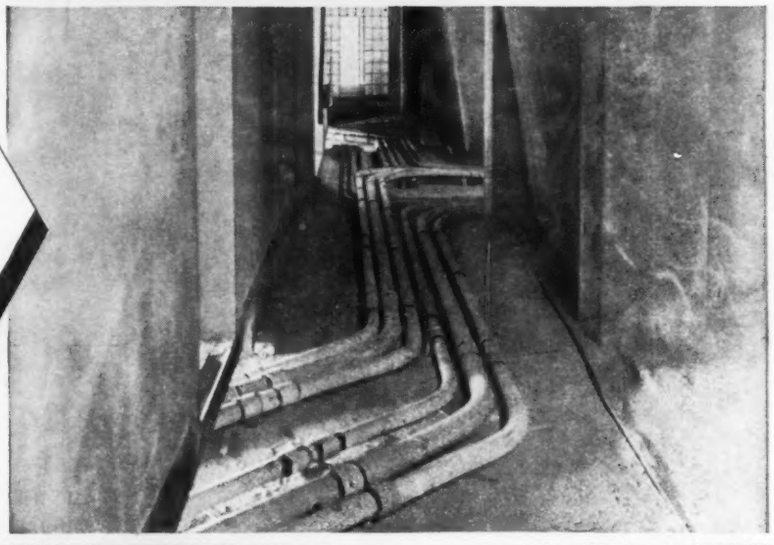
● SEATTLE CITY LIGHT had its best year in history in 1939, with revenues amounting to $6,128,742, according to annual report of A. O. Olsen, chief accountant. The previous best year had been 1938 with revenue of $5,859,973.54. Light Superintendent E. R. Hoffman pointed out that the Light Department retired $1,617,000 worth of bonds during the year, the greatest amount ever retired in any one year. Kilowatt hours generated, purchased and interchanged reached a new peak also, amounting to $463,926,000 compared with 1938's $439,541,000. Merchandise sales for the year amounted to $516,023, compared with $485,471 the previous year. Ranges on the lines Dec. 31, stood at 37,127, an all-time high.

Cut Installation Costs . . .

Rapid installation features every job where Transite Ducts are used. Their long, light lengths make handling easy and economical. Lining-up is fast and accurate . . . fewer joints are required. Their smooth bore *stays* smooth . . . assures easy cable pulls on new lines or replacements. And Transite Conduit needs no protective casing . . . saves the entire cost of concrete.

Prevent Smoke and Fire Losses . . .

Made of asbestos and cement, Transite Ducts can't burn or give off smoke or fumes. They resist flame and arc . . . prevent burnouts from damaging adjacent equipment. After burnouts, ducts are easily cleaned . . . cables readily removed and replaced.



End High Maintenance . . .

No service is too tough for Transite Ducts. Their unusual corrosion resistance keeps upkeep low. And because Transite Ducts have an unusually high rate of heat dissipation, I^2R losses are reduced . . . cables have higher carrying capacity, longer life.

For complete details on J-M Transite Conduit and Transite Korduct, write for brochure DS-410. Johns-Manville, 22 East 40th Street, New York, N.Y.

Specify

Johns-Manville TRANSITE DUCTS

TRANSITE CONDUIT for use underground without a concrete envelope and for exposed locations.

TRANSITE KORDUCT for installation in concrete. Thinner walled, lower priced, but otherwise identical with Transite Conduit.

Flood Crests Brought On By Late February Rainfall

Record rainfall between Feb. 24 and 28, which brought rivers in northern and central California to flood crests, in some instances higher than those of 1937 when serious damage was done to power houses and lines, failed to interfere materially with electric service. There were only isolated instances of interruptions and most of those were in areas inundated by floods from the Sacramento River.

Some hydroelectric plants were shut down due to high water, but precautionary measures kept water from powerhouse interiors. In 1937 several plants were flooded and seriously damaged.

Many cases of heroic action on the part of employees of the Pacific Gas and Electric Co. were reported from the flooded areas. These involved the rescue of families marooned in flooded towns and on farms.

A few minor distribution lines were reported down, but these were in sections where high water forced abandonment of homes or of reclamation pumping plants.

OFFICIAL P. C. E. A. CONVENTION HEADQUARTERS

You will find a royal welcome when you arrive at Hotel Oakland for three stimulating days of the P. C. E. A. Convention, May 22-24. The business program (we hear) is TOPS, but **we are concentrating on taking good care of YOU** . . . comfortable, outside rooms when you are tired . . . fine food in the ENGLISH GRILL . . . and when you are thirsty, we have the finest water in the world, also the OAK TAVERN.

BRING YOUR FAMILY . . AND VISIT THE EXPOSITION

May 25 the Exposition on Treasure Island will reopen, and Hotel Oakland is the most convenient place you can stay. 12 minutes to the Fair by auto . . . 1 block from electric train—ferry transporation. 500 outside rooms. Rates with bath: Single, from $3; double, from $4.

MAKE YOUR RESERVATIONS **NOW!**

H. B. Klingensmith, Manager

HOTEL OAKLAND

14th & Harrison Streets
Oakland, Calif.

OFFICIAL P. C. E. A. CONVENTION HEADQUARTERS

Supreme Court Sets Retrial For Yakima Power Contract

The Supreme Court at Olympia, Wash., on March 13, sent back for retrial a suit in which the Washington Fruit & Produce Company and 13 other Yakima business firms, tried to prevent the city from signing a 10-year street lighting contract with Pacific Power & Light Company. The business firms, acting as taxpayers, said they did not want the city tied up for so long a period with Coulee and Bonneville power soon to be available.

They contended the contract signed June 6, 1938, was void for three reasons; it was a franchise and had to be voted on by the people; the city commission should have advertised for bonds on that contract; the contract was for an unreasonable length of time.

The Supreme Court sent the case back for retrial because the earlier hearing in the lower court failed to bring facts about how soon the Bonneville or Coulee power would be available and other pertinent data which could be used to decide whether or not the 10-year contract was too long.

PG and E Files Contract With So. Calif. Edison

A contract between PG and E and Southern California Edison which will pave the way for early absorption of Shasta Dam's power output was filed last month with the State Railroad Commission for approval. Under the agreement, Edison will provide from its Big Creek and Kern River generating plants adjacent to the San Joaquin Valley, 150,000 kw. for use by PG and E.

This supply is available for use in northern California because of the southern California power surplus created by Boulder Dam. Since 1937, PG and E has been receiving up to 75,000 kw. from Southern California Edison.

● CITY COUNCIL of Pullman, Wash., has authorized replacing 26 of the present sodium vapor lights on the viaduct with white lights of 1,000 luminaries. and replacing of lights in the four pilasters on the two extremes of the viaduct with 4,000 lumen lights. It was also voted to install 2,500 lumen lights as replacements at 28 points on residential streets.

● SEATTLE CITY LIGHT's newspaper advertising campaign was awarded highest national rating in the "Socrates" awards of the February issue of Public Utility Ad-Views, national promotion magazine. The award was based on City Light's advertising to convert commercial cookery to electrical equipment on new low rates.

3 Cost-Cutting INSTRUMENTS

for the cost-saving maintenance program

By eliminating many of the time-consuming steps in electrical test procedure . . . by providing the useful scope of several or more instruments in one compact unit . . . these three WESTON Maintenance Tools bring new cost-saving opportunities to electrical maintenance. In addition, they're WESTON built . . . assuring the ruggedness and dependable accuracy so essential for active maintenance requirements.

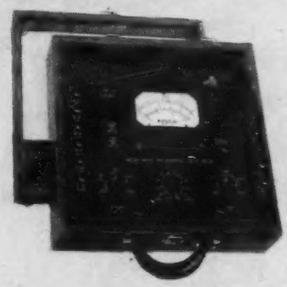
Be sure to send for complete information on these and other WESTON maintenance instruments . . . as well as on WESTON multi-range, multi-purpose instruments for all production and inspection needs. Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark, New Jersey.

WESTON *Instruments*

1

The WESTON AC Clamp-Ammeter

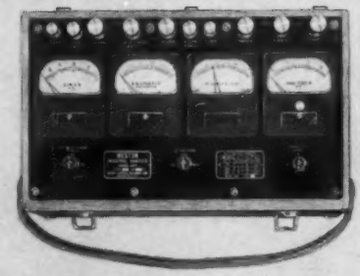
A real time saver. Simply hook the jaws around the conductor while machinery is running, and take the current reading. No production interruptions as circuits are never disturbed. Rugged construction, with high insulation. Six current ranges answer all maintenance needs.



2

WESTON Model 785 Industrial Circuit Tester

Provides new convenience in testing signal, control and electronic circuits. Has 27 voltage current and resistance ranges. High sensitivity for testing photo-cell and oscilloscope circuits, and other plant maintenance and production requirements.



3

WESTON Industrial Analyzer

Another time saver for the active maintenance department. With all interconnections made, only one hook-up is necessary for complete analyses. Measures current, voltage and power in single and polyphase circuits, as well as power factor in 3 phase, 3 wire circuits. Furnished in sturdy oak carrying case.

WESTERN REPRESENTATIVES

Seattle, Wash.
Eicher & Bratt,
263 Colman Bldg.

San Francisco, Calif.
Herman E. Held,
420 Market St.

Los Angeles, Calif.
A. A. Barbera,
Subway Terminal Bldg.

Denver, Colo.
J. W. Van De Grift,
623 Charles Bldg.

Phoenix, Ariz.
J. E. Redmond Co.,
448 W. Madison St.

Here is the Fan they'll Buy in 1940

GENERAL ELECTRIC

10" SPECIAL

*And Here's the Backing Every G-E Fan Dealer Will Get FREE

1. A full-color "stopper" display designed to catch the eye—and hold it!
2. Smart catalogs full of selling facts!
3. Direct-mail pieces to help build your volume!
4. Convincing ready-made newspaper mats for local use!
5. Powerful National newspaper ads in over 175 key cities—run at the best time to sell fans—in local hot weather!

And a plus you can't ignore—dominant, colorful National magazine advertising which month in and month out helps maintain user acceptance and keep the G-E name constantly in the limelight.

Because . . .

it's styled to the times—and ahead of them . . . it's priced right . . . it's backed by G-E advertising and promotion* . . . the General Electric name spells quality.

THOUSANDS OF DEALERS CAN'T BE WRONG

Literally thousands of dealers have tied in with G-E Fans for 1940. Almost without exception their orders include a generous stock of the G-E 10" Special. We'll take the dealers' verdict any time.

See your G-E Distributor today for full details on the 10" Special and other G-E Fans which make up the most complete line of fans in the industry.

They'll ask for G-E Fans . . . give them what they want

FAN SALES SECTION, APPLIANCE AND MERCHANDISE DEPT., GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.

GENERAL ELECTRIC

Imperial Officials Reject Power Proposal

On recommendation of Lester S. Ready, consulting engineer, Imperial Irrigation directors last month rejected a proposal from A. B. West, president of the Nevada-California Electric Corp. to supply the district with stand-by power.

The engineer said that the interconnection of the two power systems proposed by West would reduce the grade of service supplied by the district. To be of any advantage to the district, Ready declared, any agreement for interconnection between Nevada-California and the district must be combined with agreement on the part of the company to sell its electric system in Imperial County to the district at a price to be determined by the California Railroad Commission. Under such an agreement, he said, costly competition could be eliminated.

The district is however looking into a possibility of connecting its system with the Parker Dam-Blaisdell transmission line.

Wash. State Survey Shows Kw.-Hr. Drop During 1938

The Washington state public service department's survey for 1938 shows that 22 companies in the state had $448,675,584 in power assets. The private power companies sold three times as much power during the year as the municipal plants, but the total kw.-hrs. used in the state during 1938 was 14% lower than in 1937.

During the year, the 34,140 customers of the private companies paid $25,509,923 for power, representing an increase of 4.18% in the number of customers, an increase of 1.38% in total revenues, but a drop in power used. The big drop in electrical usage was in commercial houses and railroads. The increase in customers is mainly in the residential fields. Total operating revenues fell 4.7% to $27,407,884 during 1938.

● AVERAGE PRICE of electricity for domestic service on the inter-connected Utah Power & Light Co. system at the end of 1939 was 15½% below the national average. Annual report by the Edison Electric Institute for last year showed the national average 4.07 cents per kw.-hr. On the power company system the average cost for farm and residential service was 3.44c per kw.-hr. The report also revealed power company's average domestice consumer used 28% more electric service than the national average in 1939.

What OIL for GEARS?

For lowered replacement cost, less noise and more power transmitted, the right lubricant is essential

INSIDE YOUR GEAR BOXES, nearly everyone is agreed on what the proper lubricant should do. It should: (1) lower replacement cost by holding wear to a minimum; (2) cut down power losses; (3) give quiet operation.

The difficulty comes when you try to prescribe the lubricant which best accomplishes all three jobs in any individual set of gears. And since noise is the symptom of trouble most easily observed, too often a hasty operator simply pours in a heavy oil, gets a quieter action, and hands himself a medal for his smartness. He may discover later that he has raised his power cost by 15%.

HIGH PRESSURE, SMALL AREA

Here's the chief reason why gear lubrication is difficult. Your lubricant must form an oil film—

***Not* between two flat surfaces**
***Not* between a concave and a convex surface**
BUT between *two convex surfaces.*

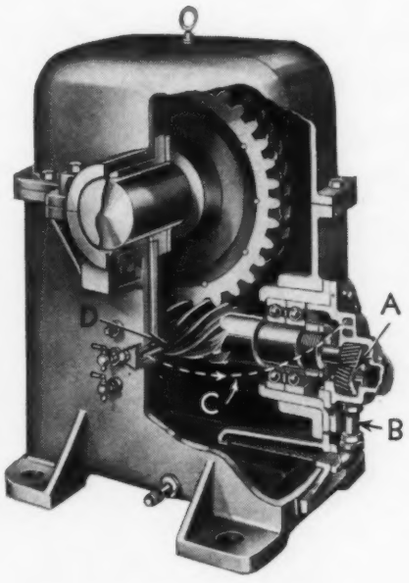
It is possible even between two convex surfaces to form the oil wedge which gives the most effective film. But it's the most difficult condition of all. As the teeth slide over each other, the oil-wedge action is abrupt, and intense pressure is forced upon a small area. (*See diagram at left.*)

Diagram showing how the meshing teeth of spur gears, under ideal conditions, form an oil "wedge."

HOW FAST DO THEY TURN?

The speed of each gear closely affects the formation of the necessary oil film. Slow-moving gears with large teeth need an oil film which stands up under pressure.

On the other hand, a high speed may tend to throw the oil away from the meshing surfaces. Speed must be carefully considered when you set out to get the best oil for any gear box.



Worm gear set with self-contained oiling system

A—Gear-type oil pump.
B—Suction line to oil pump.
C—Oil lead from pump to spray nozzle.
D—Spray nozzle to gears.

NEW GEARS, AND GEARS NOW

What of the design of your gear teeth? In worm gears, for example, a large helical angle helps to form a strong oil film. But the sliding action in such a gear increases heat. So you're apt to need a heavier oil than you would for a spur gear operating under like conditions.

Further, the design of gear teeth tells what they were like *when new.* But it may be even more important, in selecting a lubricant, to find what the teeth are like now. After a certain amount of wear, tooth contact often hits just "the high spots"... and again you need to modify your lubricant.

All these factors and others, too, must be considered in any attempt to find the oil which attains the three vital objectives in your gears. Shell has studied the problem and will continue to study it. We have found that the right selection for any set of gears involves choosing from a wide range of lubricants.

Call in your Shell representative; give him the opportunity to study your gears in day-by-day operation and recommend the lubricant that will give the most satisfactory service at lowest cost.

SHELL

Shell Industrial Lubricants

Note:— let's make sure of dependable grounds for our lightning arresters

THAT'S a sensible note because even the best of lightning arresters must have a good dependable ground. Copperweld ground rods have a thick copper exterior permanently molten welded to a stiff steel core. The copper prevents rust and provides a copper-to-copper contact between ground lead and ground rod. There are no dissimilar metals in contact at the vital point where the ground rod and the ground wire are clamped together — and no electrolytic corrosion. Copperweld clamps with their rugged one-piece body provide simple, dependable connections. Specify non-rusting Copperweld ground rods and clamps to make sure of dependable grounds.

COPPERWELD STEEL COMPANY, GLASSPORT PENNA.

Pacific Coast Representative: **C. E. INGALLS • Rialto Building • San Francisco, California**

COPPERWELD
Non-Rusting
GROUND RODS and CLAMPS

IN PITTSFIELD WORKS WAREHOUSE

SO YOU CAN GET TRANSFORMERS IN A HURRY

EIGHTY-FIVE per cent of the G-E distribution transformers sold last year were delivered "right off the shelf." To do this requires large and diversified stocks at the factory, backing up the 40 similar distributing warehouses strategically located throughout the United States.

This corner of the shipping room at Pittsfield—with over two acres of floor area, eight separate carloading platforms, and six truck-loading bays—helps to visualize how it was possible to ship 35 carloads of distribution transformers in a day and a half to supplement local stocks in the flood-stricken Middle West several years ago.

Only as transformers are made available—when and where you need them—do the facilities of the laboratory and factory mean the most to you.

GENERAL ELECTRIC

402-2

$12,700 Capacitor Installation

Saves $3600 Yearly

on Power Purchases

And brings seven additional savings to Michigan utility

THE CONDITIONS

The Michigan Gas & Electric Company, Southern Division, serving a peak load of 4000 to 5200 kw, generates about 2600 kw in its three hydro plants and purchases the rest of its requirements from a neighboring utility.

The purchased power is billed on a demand basis, with credits and penalties according to whether the power-factor is above or below 85 per cent. However, both the minimum billing allowed and the charge for the first block of power purchased are based on 250 hours' use of the *maximum* monthly demand.

THE PROBLEM

The importance of maintaining high power-factor (especially during high water periods when only the minimum amount of power is purchased) is apparent from these conditions.

Inability to boost voltage sufficiently high at the hydro plants to provide for reactive voltage drop to the points of interconnection and to the more distant system loads, has necessitated calling upon the purchased power source to supply a large amount of reactive component. This has resulted in low power-factors (as low as 61%) because the kwh requirements at such times have been low, while reactive kva remained high, with consequent costly purchased power.

In addition, from one to five hydro generators were being operated as synchronous condensers to maintain reasonable transmission voltages, which meant a great waste of hydro power.

THE SOLUTION

To improve the low power-factor and to eliminate other unfavorable conditions, 1550 kva of distribution-type capacitors were installed.

THE RESULTS

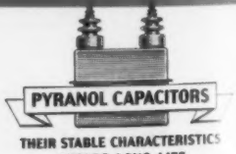
1. Average power-factor of purchased power improved from .85 to .99. This earns purchased power billing credit of 4.5% or $3600.00 annually, showing a 28.3% return on the over-all investment from this saving alone.
2. 1000 kva reduction in average monthly demands of purchased power.
3. Twenty-five per cent reduction in energy used for generator excitation.
4. Additional 800,000 to 1,000,000 kw-hr annual output from water formerly wasted operating generators as condensers.
5. Several feeder overloads relieved, postponing investment in rebuilding.
6. Released 10% to 30% more capacity in each substation—in some cases postponing the increase of substation capacity for two years.
7. Gained 700 kw additional peak capacity in hydro plants.
8. Postponed $1800 investment in regulating equipment.

SAVINGS FOR YOU?

You also may obtain significant savings from the installation of capacitors. Only a check of your system conditions will tell. A G-E representative will be glad to assist. Why not find out if you are missing any opportunities to cut costs? Communicate with the nearest sales office or address General Electric Company, Schenectady, N. Y.

HOW RELIABILITY IS BUILT INTO PYRANOL CAPACITORS

The winding of the rolls of foil and Kraft paper for G-E capacitors is entrusted to experienced operators—some with twelve or more years behind them—working on specially-designed winding machines. Throughout the manufacture of capacitors, skill of workmen and accuracy of machinery blend to give these units a reliability best attested by their record in service—99.8 per cent.



PYRANOL CAPACITORS

THEIR STABLE CHARACTERISTICS ASSURE LONG LIFE

GENERAL ELECTRIC

360-148

Grand Coulee Abandons Purchase Plan

City council of Grand Coulee, Wash., has abandoned its original idea of purchasing the existing distribution system from Three Engineers, Inc., on a proposed price of $40,000, and will construct a new municipally owned power system. L. E. Jarvis, superintendent of the Cashmere municipal system, has been named to make plans for the system. Application will be made to the Reconstruction Finance Corporation for funds, and to the Reclamation Bureau for power contract.

Jarvis estimates a plant can be built for $60,000. It has been revealed that the state department of public utilities plans to make an investigation of local power rates, with a view to sharp reductions.

Seattle to Conduct Illumination Experiment

An experiment in street illumination, aimed at reducing night traffic accidents, will be conducted by Seattle city officials, J. W. Bollong, city traffic engineer, in charge. Several types of modern electric lighting fixtures will be matched against each other in an attempt to get a light that will throw the greaest amount of illumination on the streets. Lamps of this type will then be selected and placed in Seattle's most hazardous residence intersections, under a city ordinance passed recently by the city council.

Dearborn Street will be the testing ground for the program, and a number of different well-known types of lights will be installed in avenues crossing Dearborn. The engineer will pace off 10 ft. squares each way from the lamps and into the center of the street and measure the evenness of the light diffused over the pavement. City officials' complaints against the old-type street lights is that they throw the light up in the air, while the new lights will throw the light on the street.

Puget Sound Retires Pacific Coast Power Bonds

All outstanding first mortgage 5% bonds of the old Pacific Coast Power Co. amounting to $3,195,000, have been paid off by the Puget Sound Power & Light Co. at par, plus accrued interest. The retirement will bring the company's debt reductions to a total of $15,616,997 since December 1932, President Frank McLaughlin stated, dropping its outstanding indebtedness from $75,086,214 to $59,469,217 at that time.

The bonds just retired were issued and sold in 1910 by the Pacific Coast Power Co., a predecessor of the present concern, to finance construction of its White River hydroelectric plant at Dieringer, the first major development of that kind in the Puget Sound area, with a presently developed capacity of 60,000 kw. and storage equivalent to 18,000,000 kw-hrs.

In addition to its debt retirement of the past eight years, the company, according to McLaughlin, has expended in excess of $9,500,000 during the same period, for necessary construction.

● "Your Home", a lighting and wiring reference booklet numbering 32 attractively illustrated pages, has just been published by the Western Institute of Light and Vision, Los Angeles. Designed for public distribution, the booklet simply, concisely and clearly discusses the lighting and wiring problems of the home. It is both educational and attractive. Priced at 25c for single copies, a quantity price schedule has been set up which brings unit costs down as low as 3½c. Complete information about the booklet may be secured from Frank A. Hansen, institute director.

YOU cannot buy better tapes than these Clifton products, because our 50 years of progressive experimentation have given us a superior knowledge of what is needed . . . and how to manufacture it. Get samples today from—

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Northwest Report Outlines Oregon Utility Taxes

Electric utility companies in the state of Oregan paid total taxes to the state, its subdvisions and taxing agencies in 1939, amounting to $3.205.084, according to a report just issued by the Northwest Electric Light & Power Assn. entitled "An Analysis of Utility Taxes in Oregon." The report makes it plain that this was exclusive of any Federal tax.

Of the above total, $2,750,000 in round numbers was the tax on the operating properties of the companies while the remainder was made up of taxes on non-operating property, levies by municipalities in the form of franchise of occupation taxes, and miscellaneous licenses, fees and taxes paid to various state agencies including the state unemployment tax.

The report also listed similar taxes of nine other classes of utilities as classified by the State Tax Commission. Total for all these utilities in the state was $8,541,698, with the steam railroad companies, electric utilites and the telephone companies making up the bulk of these taxes. The total property taxes of all ten utility groups was found to be 18.2% of all the property taxes levied in the state. The electric companies and the steam railroads each paid about 7% of the total state property tax, while the telephone companies paid nearly 2½%.

The report tabulates the taxes of all these utility groups by counties and it was found that 14 of Oregon's 36 counties received from 20 to 30% of their taxes from utility companies of all classes. This is shown graphically by a map of the state attached to the report, and other charts show the distribution of utility taxes by classes of taxes and by utility groups.

Supreme Court to Review Hetch-Hetchy Case

San Francisco's right to employ the Pacific Gas and Electric Co. to distribute Hetch Hetchy power has been challenged again by the Federal Government in the Supreme Court. This highest court in the nation has agreed to review the decision of the Ninth Circuit Court of Appeals upholding the contract between the city and the private utility.

The contract, under which the city receives $2,000,000 a year from PG and E, has been in effect since 1925.

Northwestern Electric to Buy Distribution System

Agreement by which Northwestern Electric Co., Portland, Ore., will purchase the distribution system of Western Light & Power Co. in Camas and Washougal, Wash., was completed in March. The Northwestern Co. is to acquire about 47 miles of distribution line in the vicinity of Camas and Washougal, serving 1,000 customers constituting about one-third of the customers in the area. The Western Light & Power Co., long owned by C. W. Cottrell and his son, Glenn Cottrell, retains a 240-kw. hydro plant on the Washougal River, the output of which is to be bought by the Northwestern Company for a period of years.

The Cottrells established the Western Co. in 1909 and have operated it ever since with rates aproximately equal to those of the Northwestern Electric Co.

Montana Power Begins Work On New Transmission Line

Preliminary work has started on a new high tension transmission line, providing additional service in eastern Montana, according to Frank Kerr, honorary president of The Montana Power Co. Engineers are now making a reconnaissance for a proposed 100,000-volt line, which will be built this year from Harlowton to Lavina, a distance of 45 miles, at a cost of $200,000.

On completion, it will be tied into the present 50,000-volt system in that area. In 1941, another 45-mile section from Lavina to Billings is expected to be completed, Kerr said.

Ziebarth Awarded Hood River Line Contract at Bonneville

Fritz Ziebarth, Long Beach, Calif., contractor, was low bidder last month when the Bonneville Power Administration opened sealed offers for construction of its 22-mile transmission line between Bonneville and Hood River, Ore. Ziebarth's bid was $163,460.

Ziebarth has held several Bonneville contracts, including those for construction of the Bonneville-Vancouver transmission line and the Columbia-Willamette river cable crossings. At present he is building Bonneville's circuit to Grand Coulee, scheduled for completion during the summer.

The Hood River line, which traverses some of the most rugged terrain in the Bonneville network, will be ready to receive power about four months after the contractor receives notice of award. Specifications are being drawn for construction of a substation at Hood River and for extension of the line between Hood River and The Dalles.

Bonneville also announced award of contracts to the General Electric Company of Schenectady for transformers costing $180,595 and for oil circuit breaker costing $150,240. The Pacific Electric Mfg. Co. of San Francisco, was awarded a contract for oil circuit breakers on a bid of $39,856.

Phelps-Dodge Copper to Supply 114 Miles of Copper Cable

An order for an additional 114 miles of 110,000-volt hollow-copper cable for the Bonneville Dam project, has been given to the Phelps Dodge Copper Products Corp. With this new order, the company will have supplied about 800 miles of copper cable to the project on the Columbia river. Phelps Dodge Copper Products holds exclusive patents on the type of hollow copper conductors which is being furnished for Bonneville. Copper used in the manufacture of this cable comes from the corporation's mines in Arizona.

ELECTRICAL TESTING LABORATORIES
Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.
2 East End Ave. New York

TORK CLOCKS

NEW ELECTRICALLY DRIVEN 1940 MODELS NOW AVAILABLE
WITH PLAIN OR ASTRONOMIC DIALS
Whenever it is desired to turn Current on and off Regularly there is a new model Tork Clock that can do it.
THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.
Representatives:
A. R. Slimmon, 445 E. 3d St., Los Angeles
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H. M. Sayers, 1019 Eastlake Ave., Seattle
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G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks
Send for Catalogue
We have been making safety tools for 24 years
THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

USE ONLY (3) KEARNEY BY-PASS DISCONNECTS INSTEAD OF (9) ORDINARY ONES ON JOBS LIKE THIS...

YOU'LL want to investigate these By-Pass Disconnects. They are being used to cut costs and simplify constructions all over the country. No longer need you face the problem of fitting equipment into your constructions which does not fully meet your satisfaction nor the requirements of the job. The new line of Kearney By-Pass Disconnects, you'll find, dependably meets factors of safety, cost and construction and effectively handles the job of disconnecting voltage regulators.

AND NOTE THIS EXAMPLE OF ECONOMIC CONSTRUCTION

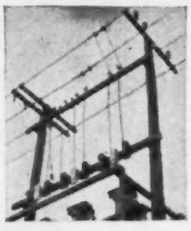


Figure 1 — Ordinary Disconnect Switches.

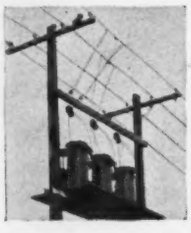


Figure 2 — Modern By-Pass Disconnects.

Figure 1 shows a platform installation of voltage regulators requiring (9) conventional switches. Figure 2 shows a similar three-phase installation using only (3) Kearney By-Pass Disconnects to handle the job safely, economically and efficiently.

But write today and ask about the other big advantages now made possible by modern Kearney open and closed type By-Pass Disconnect Switches.

Use KEARNEY BY-PASS OPEN-TYPE DISCONNECT SWITCH

EXCLUSIVE SALES REPRESENTATIVES **MAYDWELL & HARTZELL INCORPORATED**

LOS ANGELES • SAN FRANCISCO • PORTLAND • SEATTLE • PHOENIX • RENO • TACOMA • SPOKANE

● LOW BID SUBMITTED to the Stevens County Electric Cooperative, Colville, Wash., for constructing 292 miles of electric power lines, was that of Homer Johnson, Portland, at $212,207, who received the contract, subject to approval of REA. When complete, the lines will serve 700 farm families.

To R. H. WALKER, Los Angeles, for installing ornamental lighting on Olympic Blvd., Los Angeles, $58,565.

To WHITE CITY ELECTRIC CO., Chicago, for transmission lines on Bonneville project, $114,122.

To HUME & RUMBLE LTD., Vancouver, for installation of electrical wiring in the new $96,300 educational building for the Vancouver Exhibition Assn.

To C. C. CARTER, Vancouver, for wiring installation in the $21,000 addition, printing plant, Bulman Bros., Vancouver.

To GREEN BROS. CONSTRUCTION CO., Worland, Wyoming, for construction of a generating plant at Lyman, Wyoming, $5,798.

To R. A. WATTSON CO., Los Angeles, for installation of an ornamental lighting system in Arroyo Seco Parkway by the Board of Public Works, $41,433.

REA Activities

● LEWIS COUNTY PUD, Chehalis, Wash., has received a check for $39,500 from the REA, for purchase of the Cowlitz Valley Power Co.'s lines in eastern Lewis County. The company serves 315 customers.

OTERO COUNTY ELECTRIC COOPERATIVE, Cloudcroft, N. M., has been awarded $60,000 for the construction of a generating plant. The system had previously been allotted $80,000 to build about 76 mi. of line in Otero and Chaves Counties.

WEST DOUGLAS ELECTRIC COOPERATIVE, INC., Roseburg, Ore., has been awarded $2,500 for wiring.

GARKANE POWER CO., INC., Hatch, Utah, has been awarded $5,000 for wiring.
MOON LAKE ELECTRIC ASSN., INC., Mt. Emmons, Utah, has been awarded $5,000 for wiring.

BRIDGER VALLEY ELECTRIC ASSN., INC., has been awarded $5,000 for wiring.

ROOSEVELT COUNTY ELECTRIC MEMBERSHIP CORP., Portales, N. M., has ben awarded $10,000 for irrigation equipment.

TRADE NOTES

● L. W. "Doc" SWIGERT, West Coast representative of The Lau Blower Co. of Dayton, Ohio, spent several days recently in Dayton inspecting the new Lau Blower plant and facilities. "Doc," who headquarters at Seattle, Washington, also conferred with E. B. Lau, president, and R. A. Mayne, sales manager, going over the new promotion material on Niteair Attic Fans and Niteair Room Coolers.

● GEORGE A. GILLESPIE, JR., of Westinghouse Electric and Mfg. Co.'s Salt Lake City district office, has been named factory representative in Utah, Idaho, eastern Nevada, western Wyoming and southeastern Oregon. Gillespie succeeds Dean Pulsifer, who has been transferred to San Francisco to assume the duties of refrigeration specialist for northern California, Nevada, Utah, Idaho, Montana and Wyoming. Malcolm S. Henock, Westinghouse range specialist for the last 12 years, will be in charge of range, water heater and dishwasher activities in the above named area.

● DOWNING'S, a gas and electrical appliance store in Fresno, has undergone an expansion with the formation of a partnership between Ralph P. Downing, proprietor for the past two years, and William C. Nixon, Jr. The firm has acquired the exclusive Kelvinator distributorship and will engage in both wholesale and retail business. Nixon for the past year has been Kelvinator factory representative in the San Joaquin valley district.

● THE HURLEY MACHINE CO., through R. G. Chamerlain, vice-president in charge of the Pacific Coast Division, has appointed George C. Davis district manager for the company in Utah, Idaho, Colorado and parts of Nevada, New Mexico and Wyoming. Davis, for the past five years, has been district manager in the northern California territory.

● KEN ROGERSON, formerly sales manager for Peterson's, Inc., has opened his own modern, up-to-date General Electric appliance store at 263 S. State Street in Salt Lake City.

● THE KWIKON CO., Chicago, has named The Hastings Richards Co., Albuquerque, N. M., as their agents in New Mexico and Arizona. Frank H. Bran Co., San Francisco, will cover northern California.

● SMITH APPLIANCE CO., Ogden, Utah, formerly with the J. C. Penney Co. store, has taken over the appliance department of the C. C. Anderson Co. The new department will be managed by Reed R. Smith.

● D. E. SANFORD CO., through its head, Fred Sanford, has added B. Kernfield to its staff in San Francisco; J. Warren to the Seattle office of the company. Both men will work exclusively on the distribution of Cory Glass Coffee Makers. Sanford also declared that his company is no longer handling Vidrio Products, Nu Tone Chimes and Toast-O-Lator.

● M. B. AUSTIN, The M. B. Austin Co., Chicago, has appointed Nicholas & Cook, San Francisco, as their representative in northern California and Nevada.

● SUTTON & HANLON, manufacturers agents located at the Western Furniture Mart, San Francisco, have changed their name to Sutton & Landlay. Headquarters will continue to be at the Mart.

● CONTINENTAL SALES CO., San Francisco, has taken over the agency for Sterro Washer, made by Vidrio Products Corp., Chicago.

● THE CLAIRE F. PENTZ FURNITURE CO. has been appointed dealer for Hotpoint ranges, refrigerators and hot water heaters in Omak, Wash.

● THE TRI-STATE SUPPLY CORP., Los Angeles, have been named new agents for the Crescent Wire & Cable Co., Trenton, N. J., according to Art Howard of Tri-State.

ABOUT PEOPLE

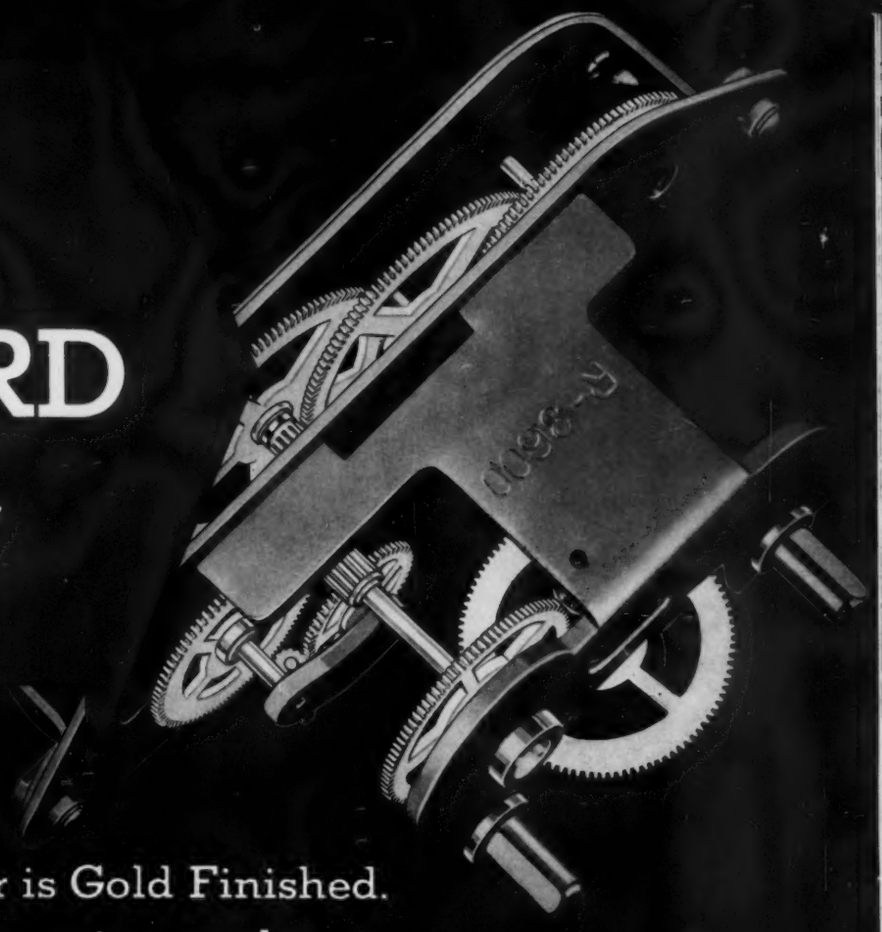
Portland General Electric Reorganizes Personnel

Further tightening up its organization and streamlining it for higher efficiency, the Portland General Electric Co. has announced further reorganization of its personnel. Perhaps the most significant move has been the complete divorcement of the traction properties from those of the electric utility. Shifting of personnel formerly divided in responsibility between the two properties has occasioned other alignments of staff.

On the heels of the resignation of Franklin T. Griffith as president to become chairman of the board, and the advancement of James H. Polhemus to the presidency, came the retirement of Orin B. Coldwell, vice-president of the company for the past 24 years. His experience and judgement will still be available to the company as consulting engineer, an experience of 48 years as an active member of Portland General Electric Co. and its affiliated organizations.

George E. Sullivan, who has been assistant to Polhemus and general division manager, has been made vice-president and assistant general manager. Polhemus is general manager as well as president. Sullivan, a native of Oregon, is son of the late T. W. Sullivan, hydraulic engineer who pioneered the original Oregon City development of

GOLD STANDARD *for Meters*



This Meter Register is Gold Finished.
There can be no corrosion to slow it
down or disturb its Long-Time Accuracy.

The precision-cut gears and shafts in every Westinghouse meter are gold finished—to guard them against the possibility of corrosion. This is a time-proved Westinghouse feature—costly for us, but it saves money for you.

Gear teeth are milled—not stamped. They have involute teeth designed to roll with a minimum of friction. The gold finish then preserves this fine freedom of motion under all conditions of operation.

This, plus other Westinghouse features, are the reasons why Westinghouse meters set a high standard—can be depended upon to meter accurately, without mechanical adjustments or periodic maintenance—why they permit a greatly extended period of inspection. J-40261

ALL WESTINGHOUSE METERS—SINGLE OR POLYPHASE —HAVE THESE COST-REDUCING FEATURES

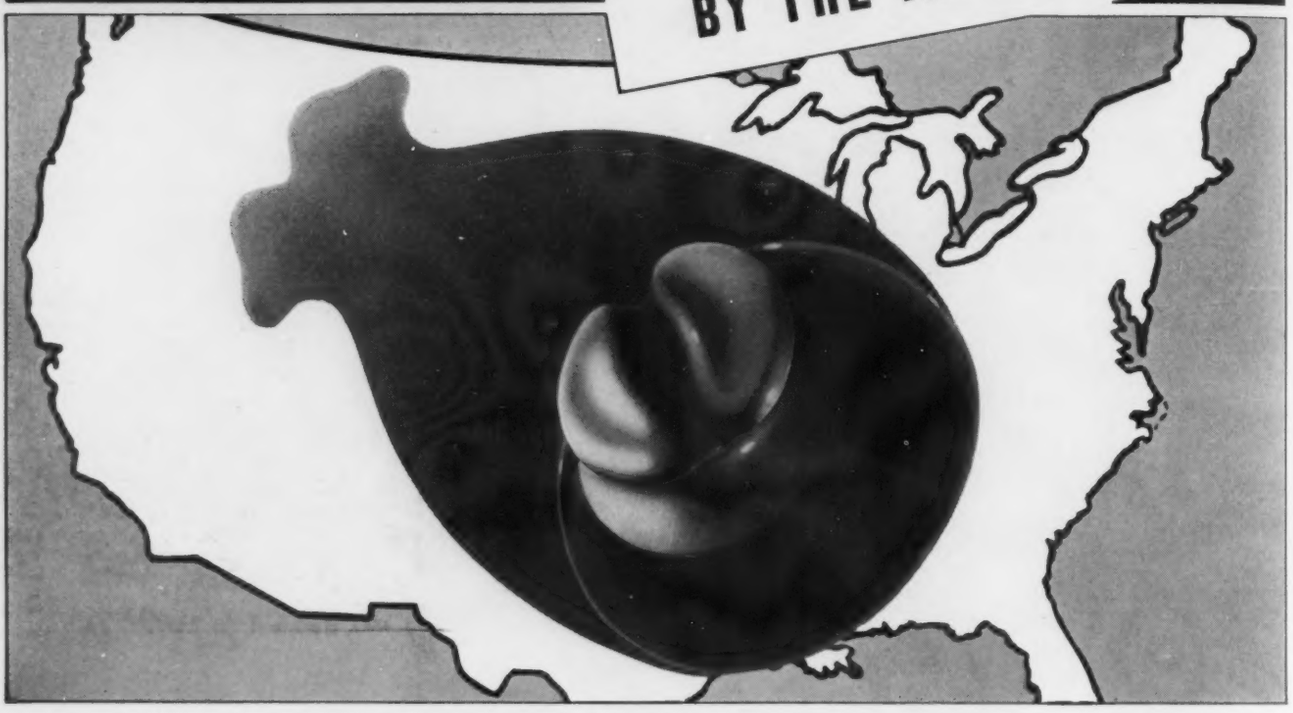
1. Lifetime Ball & Jewel Bearings—no lubrication, no periodic adjustments or replacements.
2. Gold Finished Register—no corrosion to cause friction.
3. One-piece Electromagnet—fixed performance characteristics.
4. No mechanical adjustments—permanent long-time accuracy assured.

Ask any Westinghouse man to give you complete details. Or write to Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Pennsylvania.

Westinghouse Meters

Another reason why.

R-I-P PORCELAIN IS APPROVED BY THE INDUSTRY



PROMINENT WESTERN UTILITY JOINS SWING TO R·I·P, REPORTING 100% WESTINGHOUSE REPLACEMENTS TO PREVENT RADIO INTERFERENCE

The Tucson Gas Electric Light and Power Company is so pleased with the results obtained from Westinghouse R-I-P Porcelain that it has standardized 100% on R-I-P for replacements as well as for a new section of 44 KV line now being built between Tucson and Nogales—as a *preventative measure* against radio interference.

In a single year operating companies, accounting for a third of the total potential current output of the U. S., have approved and installed R-I-P Porcelain. This swing to R-I-P is proof of the industry's recognition that Westinghouse Radio Interference Proof Porcelain is the one sure way to wipe out such customer complaints.

Westinghouse Research Laboratories developed the R-I-P treatment . . . made it a part of the insulator. There are no moving parts to be replaced or adjusted. Low cost and long life make them the solution for radio interference at the insulators on your transmission and distribution lines. Overnight service available from nation-wide depots and porcelain plants in Derry, Pennsylvania and Emeryville, California.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA., DEPT. 7-N.

J-05102

Westinghouse Porcelain

W WESTINGHOUSE ELECTRIC

Frigidaire

ANNOUNCES A NEW ELECTRIC RANGE to sell for $99.75*

Opens the Door to New Prospects and New Profits!

It's easy to make an electric range to sell for about $100.

But imagine a range in this price class with all these top quality features!

- ✔ A one-piece steel cabinet finished in Lifetime Porcelain!
- ✔ A one-piece stainless porcelain cooking top and back panel!
- ✔ Three 5-speed *enclosed* surface units. And all surface units grouped on the left of the range where 85% of women prefer to have them!
- ✔ Easy-to-read silver-contact switches, located where 9 out of 10 prospects want them, on the front of the range!
- ✔ A big, roomy, twin-unit oven, porcelain inside and out, and heavily insulated with glass wool. Measures 16″ x 17″ x 19″. Has *hydraulic* thermostat, exclusive "Evenizer," nine embossed shelf guides, and a counter-balanced door!
- ✔ A high-speed broiler, with several positions!
- ✔ A "Thermizer" well-cooker with *enclosed* cooking unit. More than 5-quart capacity. Three position trivet!
- ✔ An easy sliding storage drawer . . . convenience outlet . . . armored wiring to protect against damage and spill-overs, and many other sales-winning features!

Value? All of these features are found in the most expensive Frigidaire models!

Compare this kind of quality with what you've seen in this price class. It takes only one look to realize that here is a range that will open the door to new prospects and new profits for Frigidaire Dealers.

* SPECIAL MODEL B-10. Price quoted is retail price, exclusive of local taxes and installation, in Dayton, Ohio, and many other cities. Proportionately low prices elsewhere.

FRIGIDAIRE DIVISION • General Motors Sales Corporation, Dayton, Ohio

COLDWELL SULLIVAN ROBLEY HODGE

the company. George Sullivan, after gaining a degree of engineer from University of Oregon, began with the company as a workman with its first hydro plants and has worked up and through the sales end as assistant to A. C. McMicken, and then as general division manager for areas outside of Portland.

In the new alignment R. E. Brennan becomes treasurer and comptroller; Frank M. Warren, Jr., who has been assistant to Sullivan becomes assistant to Polhemus; Cassius R. Peck of the legal firm of Griffith, Peck & Coke, becomes corporation secretary and the firm remains as general attorneys for the company. R. M. Townsend, who has been with the company actively for about 52 years, continues as property agent, with a slight change of responsibilities. Walter Brenton continues as chief engineer, with enlarged duties occasioned by the retirement of Coldwell; Walter W. R. May becomes director of public relations, an expansion of the industrial development department he has headed; Ralph Millsap continues as advertising manager with enlarged duties.

R. R. Robley, who has been assistant general superintendent and operating superintendent becomes assistant to vice president Sullivan. A. C. McMicken continues as general sales manager; Fred G. Hodges, who came from Sierra Pacific Power Co., Reno, two years ago, becomes general division manager succeeding Sullivan; Loren E. Hinman, who has been executive assistant, becomes assistant to E. W. Bredemeier, manager of the customer service department; Lester G. Park becomes assistant treasurer and general auditor, and E. I. Snyder steps up from accountant to become tax supervisor. E. D. Searing, who has been safety engineer for both the traction company and PGE, becomes safety engineers for the PGE Co. alone. C. P. Osborne continues as general superintendent.

To the traction company, which has even moved its offices away from the Electric Building to the car yards, go William Lines, Gordon Steele, V. L. Thomas, H. E. Conkling and J. H. Dennemann. Lines retires as vice-president of PGE and also from the board.

The new board now consists of Franklin. T. Griffith, chairman; James H. Polhemus, president, and E. B. MacNaughton, president of the First National Bank of Portland, as the holdovers from the previous board; Amedee M. Smith, president of Willamette Iron & Steel Corp.; L. C. Newlands, president of Oregon Portland Cement Co.; Robert H. Strong, president of Robert H. Strong & Associates, property management—all of Portland, plus Paul Wallace, an industrialist of Salem, Ore.

With rate cuts of $570,000 as of Jan. 1, and another of $100,000 to domestic rates March 15, and cuts in commercial and power rates of approximately $500,000 due some time in April, the company's rates will have been brought down to within the tax difference between the Bonneville rates and its own. Thus the company gives away virtually all of its $1,509,000 net income of 1939 in rate reductions which it must recover in increased efficiency and greater sales. These organization changes are declared to be in line with that policy by the management of Portland General Electric, the first private company to take on Bonneville power.

● FIRST CERTIFICATE of Adequate Wiring to be issued in the city of Provo, Utah, has been presented to Clyde P. Crockett, local manager for J. C. Penney Co. Peck Electric Co. of Provo were the contractors.

Stocks at San Francisco
Electrical Specialty Co., Inc.,
316 Eleventh Street

Stocks at Los Angeles
Electrical Specialty Co. of So. Calif.,
451 South San Pedro Street

Stocks at Seattle
Electrical Specialty Co., Inc.,
714 Fourth Avenue

For the Coast Trade

At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.

Driver-Harris Company
Harrison, N. J.

TRADE MARK REG. U.S. PAT. OFF.
Nichrome

PRINT IN BINDING

THIS IS HOW
HOTPOINT helps you sell Electric Water Heaters

. . . AND NO WONDER WE SELL MORE HOTPOINT ELECTRIC WATER HEATERS

1 **"All of us dealers are alike** in one respect—we'll take all the sales promotion help we can get. And, believe me, we get plenty from Hotpoint! Always have. That's why Hotpoint has always been out in front, I guess, in electric water heater sales.

2 **"Look at the Hotpoint Window Display Material,** for instance. It's colorful, dynamic—really stops people and brings 'em in. But that's not all! Hotpoint gives us floor displays, decorative signs, banners and a great variety of hard-hitting material that builds sales.

3 **"Hotpoint's Direct Mail Material** actually carries the story of modern electric water heating service right into people's homes, and it's so good that, all by itself, it stirs people to buy. Yes sir! Hotpoint gives dealers more help than any manufacturer I know of . . .

4 **". . . Including National Magazine Ads, a series of Newspaper Ads and Posters** that "pull" business. And Hotpoint offers novel Water Raters, Visualizers, Salesmen's Kits, Contest Material, Sound-Slide Films—just about everything a dealer could ask for to help him sell!

5 **"You bet it's wonderful!** But—great as it is, it wouldn't mean a thing unless it was all built around an Electric Water Heater bearing the famous Hotpoint name. People have confidence in Hotpoint—have had for 30 years. It's best to concentrate on Hotpoint."

THE VOGUE. Hotpoint's **RECTANGULAR**-type Water Heater, now standard of the industry and increasing in public popularity, combines smart styling with Hotpoint's proved economy and efficiency. **THE MASTER** round models, equally efficient, are also available.

HOTPOINT doesn't merely promise—Hotpoint delivers! And this year Hotpoint delivers a brilliant line of electric water heaters, backed by the greatest array of sales promotion helps you've ever had. Cash in on the current boom in home building and modernization. Sell Hotpoint Electric Water Heating and profit! Get busy now—today!

EDISON GENERAL ELECTRIC APPLIANCE COMPANY, INC., 5612 West Taylor Street, Chicago, Illinois

Calrod

Hotpoint's bakelite-sealed, airtight heating unit is immersed directly in the water inside the tank. All heat generated is delivered directly to the water. There is no flame—no fire hazard—no waste.

AUTOMATIC ELECTRIC **Hotpoint** WATER HEATERS

ELECTRIC RANGES • REFRIGERATORS • WASHERS AND IRONERS • CLOTHES DRYERS • DISHWASHER-SINKS

KITTY: "Why did Dad talk to me like that, Mom—I didn't do a darned thing."

MOM: "I know, Kitty honey, your dad's upset because the water heater is actin' up again. That's why I'm heating water for Gramp's hot water bottle."

DAD: "You say all I have to do is install the G-E and forget it. That sounds too easy to be any good. What's the catch?"

SALESMAN: "There is no catch, Mr. Dugan. If you'll step over to the chart, I'll show you."

MOM: "Well, of all things—that's Gramp singing in the bath tub!"

GRAMP: "She'll be comin' round the mountain when she comes. She'll be wearin' red pajamas when she comes. She'll be drivin' six white hosses . . ."

See This DRAMATIC NEW G-E WATER HEATER PICTURE!

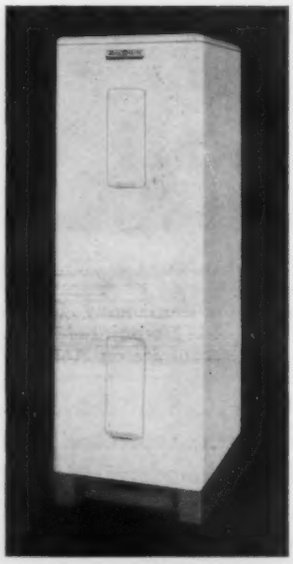
The General Electric Water Heater line is *complete.* Sizes for every need—from 2 to 140 gal. capacity. Rectangular, round, table top, wall type models. Monel or galvanized. Single or twin units.

●

All G-E Water Heaters have the famous

CALROD

immersion type heating units. Calrod heats water by direct contact, cheapest electrical method known. Durable, trouble-free. Will not scale or rust.



JUST ONE OF THE MANY NEW G-E WAYS TO MORE WATER HEATER SALES

Your G-E Appliance Distributor has something *red hot* to show you! It's General Electric's new full length sound slide film "We Like It Hot!"—and it's a *"natural"* for water heater sales. See it—and you'll see why! And see General Electric's many other new "props" and plans to get more water heater business . . . .

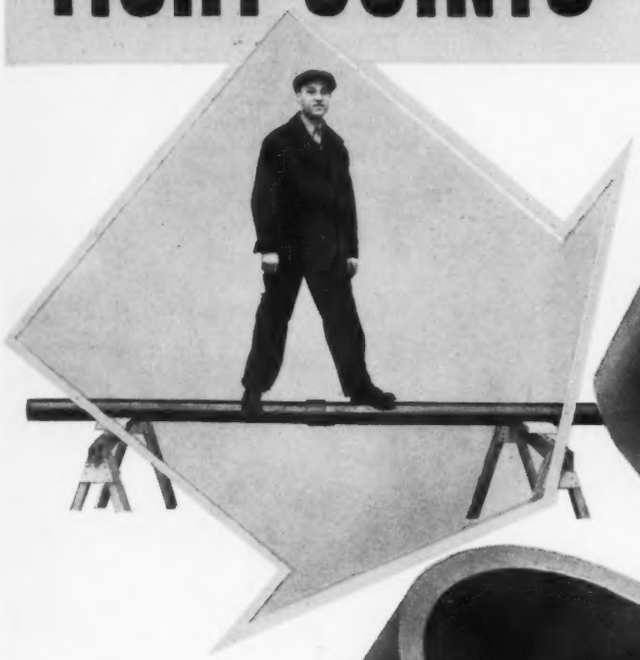
1. A big, new, profusely illustrated Sales Presentation Book. **2.** A new and entirely different Sales Manual in which interesting pictures take the place of dry text matter. **3.** A new Wall Display Chart and Visualizer. **4.** The new and novel G-E Heater-Meter. **5.** And the sensational new film "We Like It Hot!" Phone your G-E Distributor NOW and *see for yourself.*

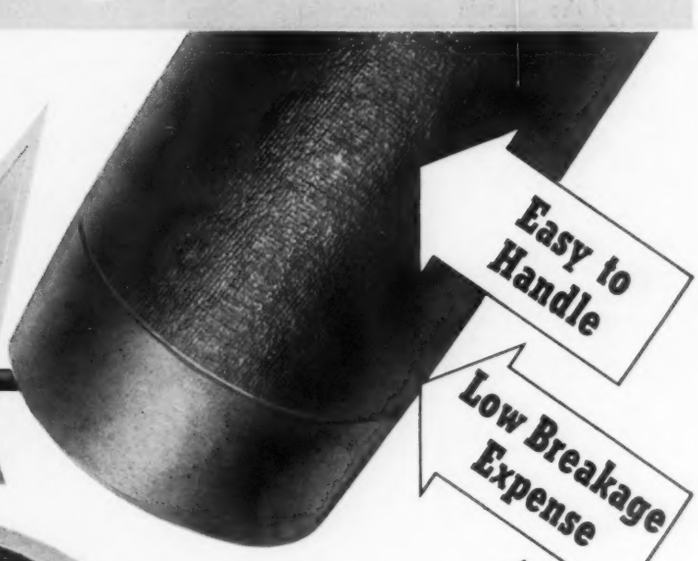
GENERAL ELECTRIC COMPANY, APPLIANCE AND MERCHANDISE DEPT., BRIDGEPORT, CONN.

GENERAL ELECTRIC

TIGHT JOINTS

PREVENT SEEPAGE OF WET CONCRETE WHEN INSTALLING CONDUIT





Easy to Handle

Low Breakage Expense

Resists Soil Acids

A complete, modern organization is devoted exclusively to the manufacture of fibre conduit. Daily laboratory tests and careful production inspections account for a high grade, uniform Fibre Conduit.

For Economical, Complete and Permanent Protection

Engineers Recommend

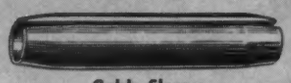
FIBRE CONDUIT

LINE MATERIAL CO.

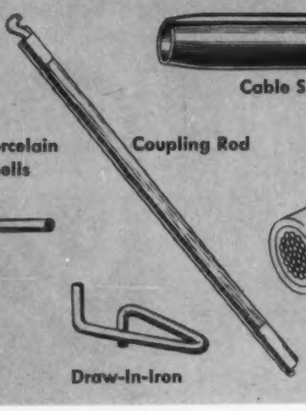
MILWAUKEE • WISCONSIN

All your underground needs from ONE SOURCE

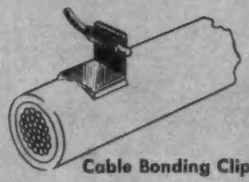
Round Porcelain Duct Bells



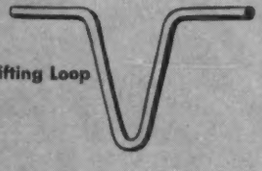
Cable Sleeve



Coupling Rod

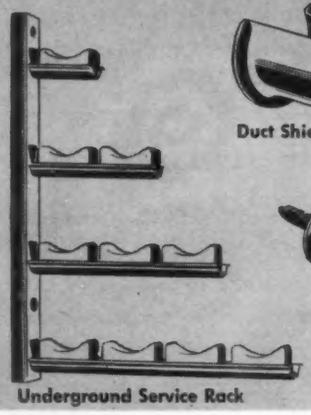


Cable Bonding Clip

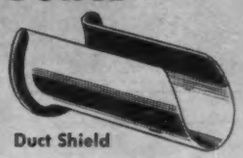


Lifting Loop

Draw-In-Iron



Underground Service Rack



Duct Shield

Manhole Outlet

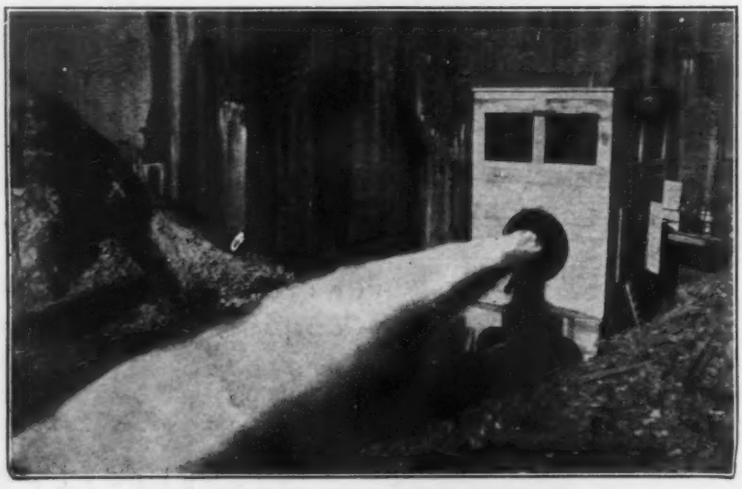
Breuner Reelected President Northern Calif. Appl. Society

Louis J. Breuner of John Breuner Co., Oakland, was unanimously re-elected president of the Electric Appliance Society of Northern California, at its annual meeting recently held in the society's headquarters at the Western Merchandise Mart, San Francisco. Other officers and directors who were re-elected follow:

H. A. Saxe, Jr., Sterling Furniture Co., vice-president; R. E. Fisher, Pacific Gas and Electric Co., secretary; S. W. Newman, Chas. Brown & Sons, treasurer; B. W. Reynolds, Pacific Gas and Electric Co., promotional director; J. A. Werner, Dohrmann Commercial Co.; E. C. Lipman, The Emporium; Edward Lachman, Lachman Bros.; Marshal Hale, Jr., Hale Bros.; E. C. Elliott, Jackson Furniture Company; Philip Harris, Redlick-Newman Co.; Carlton Bryan, Maxwell Hardware Co.; T. W. Sullivan, Capwell, Sullivan & Furth; L. W. Hink, J. F. Hink & Son; E. D. Hotaling, Apex Rotarex Mfg. Co.; R. E. Robertson, Frigidaire Corp.; A. H. Meyer, Leo J. Meyberg Co.; F. S. Fenton, Jr., Easy Washing Machine Co.; J. P. Carson, Graybar Electric Co.; D. E. Harris, General Electric Supply Co.; R. J. Holterman, Westinghouse Electric Supply Co.; LeRoy Smith, California Retail Hardware Assn.; George W. Fitch, Retail Furniture Assn. of California; Frank K. Runyan, Western Merchandise Mart, and Arthur E. Rowe, Pacific Radio Institute.

Founded in 1933, and patterned in some respects after its outstandingly successful "sister organization", the Gas Appliance Society of California, the Electric Appliance Society has firmly established itself as one of the leading co-operative groups in the United States.

Pelton Discharge Regulators for Storage and Flood Control Dams



ALTHOUGH the discharge regulator is but one of the many products offered by Pelton engineers for power, flood control or water works service, it well typifies the engineering and manufacturing precision which characterizes all Pelton products.

Correct design, with utmost accuracy in shop and field operation, is the basis of successful performance of Pelton impulse or reaction turbines, valves and accessory equipment. Ask for catalogs.

The Pelton Water Wheel Company
HYDRAULIC ENGINEERS

120 Broadway, NEW YORK — 2919 Nineteenth St., SAN FRANCISCO — Paschall Station, PHILADELPHIA

BLW THE BALDWIN GROUP PELTON
Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

Waters Named New Head of Telluride Power

Election of Herman B. Waters to the presidency of the Telluride Power Co. to fill the vacancy created by the death of Paul N. Nunn was made at a board of trustees meeting recently.

In deciding that Waters would continue to serve as general manager, the board also appointed Paul P. Ashworth, formerly distribution engineer for the Utah Power & Light Co., as assistant general manager.

Waters has been associated with the company for 30 years, having been the engineer in charge of construction of the plant on Malad river near Thousand Springs, Idaho, in 1911. He was chief engineer of the Idaho Power and Light Co. before the Telluride company sold that unit to Idaho Power. Appointed general manager in 1916, Waters was elected vice-president in 1930.

Ashworth, who left Utah Power and Light 18 months ago to join the Telluride organization, is a native of Beaver, Utah, and a Cornell graduate.

Telluride maintains operating headquarters in Richfield, furnishing power to Millard, Sanpete, Sevier, Piute, Garfield and Beaver Counties in Utah.

● KENNETH RYALS, electrical contractor of San Francisco, was elected president of the San Francisco Electrical Development League and was placed in office March 4th. Ryals is co-owner of the Stone-Ryals Electric and Mfg. Co., San Francisco. The Electrical Development League is the weekly service club organization of the electrical industry in the San Francisco area.

● WILLIAM HAMMOND, Longview, Wash., electrician in that city for 18 years, has been named state electrical inspector for southwest Washington, including Cowlitz, Clark, Lewis, Pacific, Wahkiakum, Klickitat, and Skamania Counties. He replaces Steve Gardand of Chehalis.

Every house needs
Westinghouse

"ADVISE-A-BRIDE" CONTESTS will pull them in!

$23,000 IN ELECTRICAL PRIZES *plus* $500,000 in Advertising and Promotion

...to give you a BIGGER CUT of the electric range business this spring!

The biggest spring promotion in Westinghouse history starts April 18! For 5 big weeks, prospects will call at Westinghouse dealers for *free entry blanks* and facts to help them WIN a brand-new Westinghouse *Commander* Range, a Westinghouse *Aristocrat-Six* Refrigerator, or a *Streamline* Adjust-o-matic Iron in "Advise-a-Bride" Weekly Contests. *What an opportunity for a big, spring clean-up!*

Four-color, full-page ads in The Saturday Evening Post, Collier's and Life will announce these exciting, easy contests early this month. Lots of follow-up advertising, too, in other national magazines, newspapers, and over 98 N.B.C. Blue Network Stations from coast to coast. And it's all wrapped up in a sound selling plan specifically designed *to build store traffic* and to pull in prospects *anxious to hear the complete sales story* on Westinghouse Electric Ranges and Refrigerators!

If you haven't seen the new *Westinghouse "Advise-a-Bride" Contests Plan Book*, get in touch with your Westinghouse Distributor immediately or wire Westinghouse Electric & Mfg. Co., Dept. 33, Mansfield, O.

TUNE IN "MUSICAL AMERICANA"
N. B. C. BLUE NETWORK, EVERY THURSDAY EVENING

5 BIG WEEKLY CONTESTS
April 18 to May 23
70 PRIZES EACH WEEK!

10 Westinghouse Aristocrat-Six Refrigerators
10 Westinghouse Commander Electric Ranges
50 Westinghouse Streamline Adjust-o-matic Irons

Westinghouse PACEMAKER Ranges
"The Line of Least Resistance"

"Through Every Step"

Limiting its activity solely to the making of electrical wires, cables and accessories, General Cable carries the processes of manufacture through every step in its own plants. General Cable rolls its own copper rods, draws its own wire, creates its own insulating compounds, and does all those many other things involved in the manufacture of electrical conductors. Through every step, quality is held to standards prescribed by the General Cable Research Department and maintained within the same exact limits in all company plants. Uniformity of quality has been an outstanding advantage of General Cable Wires and Cables.

GENERAL CABLE

BARE and INSULATED WIRES and CABLES for EVERY ELECTRICAL PURPOSE

General Cable Corporation Sales Offices: ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT KANSAS CITY (MO.) • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • ROME (N.Y.) • ST. LOUIS • SAN FRANCISCO • SEATTLE • WASHINGTON (D.C.)

for Better Water Heater Installations

TYPE "MO" MULTI-BREAKER

· *List Price* $2.40 ·

There are several reasons why the Type MO Multi-breakeR is a "natural" for water heater installations.

This double-pole circuit breaker is extremely low in price. The installation costs less than replacing the service entrance switch with one of greater capacity. Even in new homes where separate metering for water heaters is required, the double-pole Type MO Multi-breakeR is just the thing for the water heater circuit. In new installations using a single meter, the water heater circuit should, of course, be included in the Multi-breakeR service center.

All Multi-breakeRs afford the modern convenience and protection which your customers are quick to appreciate. Standardize on Multi-breakeRs for your water heater installations. If you haven't the complete story, write for Bulletin CA-543.

CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

Water heater photos through courtesy of Edison General Electric Appliance Company, Inc.

PRINT IN BINDING

Kearney Sr. Retires and Names Kearney Jr. His Successor

After 14 years active service as president of his own business, James R. Kearney, Sr., St. Louis manufacturer of overhead and underground utility equipment and veteran of the electrical industry, will become active chairman of the board of his company and his son, James R. Kearney, Jr., who has grown with the organization, from advertising manager to executive vice-president, will assume the duties of president of the corporation.

Mr. Kearney, Sr., inventor of some twenty electrical items, but particularly well known for his aggressive pioneering of the use of solderless wire connectors for making electrical connections, instead of hazardous solder, organized his company in 1926 with a few patented products to manufacture and five men to help him launch the enterprise.

James R. Kearney, Jr. has become well acquainted with the power field through his association with many committees and organizations.

He is a graduate of the Univ. of Missouri, has held various offices, up to the presidency of the National Industrial Advertisers Assn., and as an active member of the St. Louis Electrical Board of Trade.

Walter A. Heinrich, one of the five founders of the Kearney Corp., was named director of engineering and executive vice-president of the company.

His experience in the design and production of equipment for power line maintenance and construction needs began back in 1914 when he was employed in the engineering department of a prominent manufacturer of electric utility products. At the time that he left this company to help organize the Kearney Corp., he was in charge of engineering and development of electrical apparatus.

L. L. Crump, who has been the assistant chief engineer of the company for seven years, was advanced to the position of chief engineer to replace Heinrich.

General Electric Wire Expert Visits West

One of the foremost experts on rubber compounds for wire insulation, E. W. Schwartz, director of the works laboratory, General Electric Co., Bridgeport, has been visiting the divisions of the company in the West to bring an authoritative picture of the new thin-wall wire situation to G-E men. A rubber technologist for over 20 years, Schwartz is telling of new product development in wires and insulating compounds, both rubber and synthetic.

JAMES KEARNEY, JR. WALTER HEINRICH JAMES R. KEARNEY, SR.

The essential differences in these new materials are being explained so that the G-E men can give first hand information to the trade.

According to Walter J. Delahanty, San Francisco, stocks of the new thin-wall wires are on hand and awaiting code approval and local ordinance acceptance. Rewiring can begin anytime now. *(See Profiles)*

Howe New Westinghouse Manager in Northwest

Kendall L. Howe, an employee of the Westinghouse Electric & Mfg. Co. since 1924, has been named manager in charge of sales for the company's Seattle, Spokane and Tacoma offices. He succeeds the late Buell Blake. The appointment was announced by Charles A. Dostal, Pacific Coast district manager, who flew from San Francisco to Seattle to make the change in executive heads.

Howe was graduated from the Univ. of Washington, Seattle, in 1923, with the degree of bachelor of science in engineering. In 1939 he was transferred to the Westinghouse San Francisco offices after serving 12 years in the company's engineering department in Seattle.

● E. G. Hall, former manager of General Electric's wiring material sales section in Boston, has been transferred to Los Angeles. He has been with G-E since 1910, when he entered the accounting department. He was shifted to merchandise sales at Bridgeport in 1923, later becoming district sales representative in New York state, Portland, Ore., Los Angeles and Boston. He will be succeeded by J. H. Newman, former district representative in Boston.

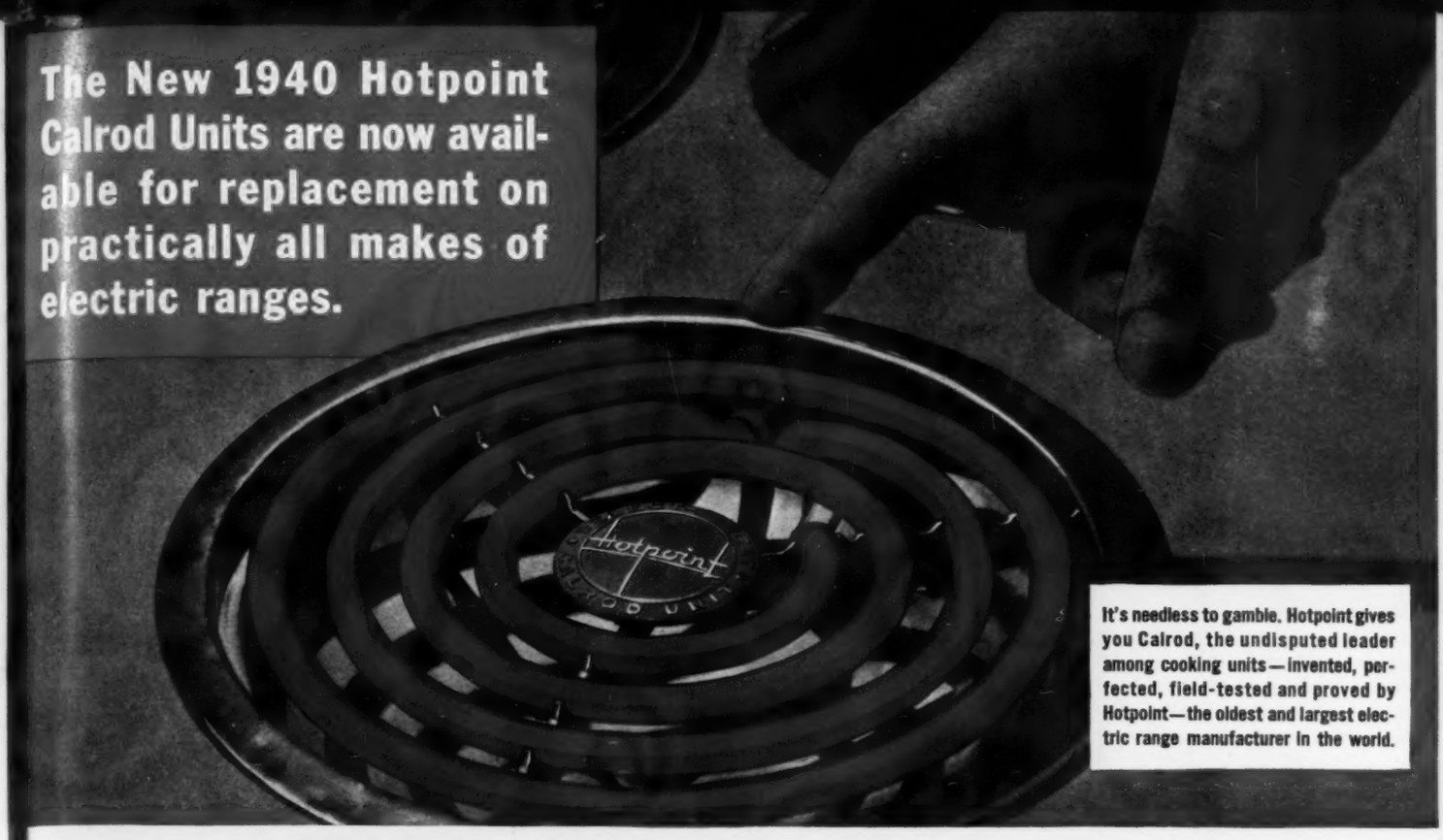
WWP Veteran Employees Honored at Banquet

Veteran employees of The Washington Water Power Co., numbering more than 300, gathered at the Electric Trail Blazers' second annual banquet last month to hear Dr. W. J. Hindley, former mayor of Spokane, and to witness J. E. E. Royer, vice-president and general manager of the company, present 20-year service pins to 18 employees of the utility and to eight Spokane United Railway employees.

Washington Water Power men and women honored were Louis M. Altman, Vern A. Beckman, Rush W. Brown, Irwin Buckner, Clay R. Cate, Elmer I. Coile, Miss Roberta Dockendorff, C. C. Eggers, Forrest H. Garrett, I. H. Hayes, William C. Irwin, Bernard W. Lindberg, Ira E. McKenzie, Axel E. Melander, Fred W. Olson, Harry C. Schultz, Earl L. Tracy and Ray L. Wetherell.

● Will O. Smith, district sales manager for General Electric Supply Co. in Salt Lake City, was speaker at a meeting of the Salt Lake Real Estate Board, Feb. 28.

● Harry A. "Pat" Patton, third vice-president of IAEI, and electrical inspector for the Washington Surveying and Rating Bureau, Seattle, died recently at Tacoma. Mr. Patton came to Seattle in 1900, entering the employ of the Light & Power company there as a journeyman. In 1904 he went with the Rating Bureau. He was a member of the old Western Assn. of Electrical Inspectors, and was instrumental in organizing the Northwestern Electrical Inspectors Assn., which later merged with the International.


The New 1940 Hotpoint Calrod Units are now available for replacement on practically all makes of electric ranges.
Hotpoint
It's needless to gamble. Hotpoint gives you Calrod, the undisputed leader among cooking units—invented, perfected, field-tested and proved by Hotpoint—the oldest and largest electric range manufacturer in the world.

New 1940 Hotpoint Calrod

Electric Cooking Unit Has Many Exclusive Features

AGAIN Hotpoint advances the standard of electric range units with this lighter, faster-starting, self-cleaning 1940 Calrod. It costs less than ever—provides more improvements—makes experiment with unproved units unnecessary.

HOTPOINT CALROD PROVIDES MORE FEATURES AT LESS COST

1. **LIGHTER** in weight by 20% than old style rod-type units.
2. **FASTER**—Hotpoint's 1940 Calrod starts cooking in less than half a minute.
3. **SELF-CLEANING**—Calrod coils are self-cleaning. No cracks or crevices to catch grease. New, easily removable reflector can be washed like a pie tin.
4. **INCONEL METAL SHEATH**—Calrod is the only unit using International Nickel Company's Inconel which contains approximately 93% nickel and chromium.
5. **GLASS SEALED LEADS**—Prevents seepage of air or moisture into insulation; prolongs life.
6. **PROTECTED BY 67 U. S. PATENTS**—Hotpoint Calrod gives you a tremendous edge on competition.
7. **PROTECTED TERMINALS**—Calrod is the only unit with side terminals—out of heat and spillage zone.
8. **CORROSION RESISTANT**—Calrod is the only unit entirely built of corrosion-resisting materials.
9. **LONG LIFE**—Calrod is 99.99% perfect by field experience—assuring satisfied customers and negligible service costs.
10. **ECONOMICAL**—Calrod provides more heat from less current. You can prove this in two minutes.

Only HOTPOINT CALROD Makes Possible 2-Way Profit

1. UNIT REPLACEMENTS. Hotpoint Calrod—the outstanding electric range development for 1940 is specially designed for the replacement market.

2. NEW RANGE SALES. New sales of 1940 Hotpoint Electric Ranges are also your rich reward for putting this Calrod Replacement Plan to work.

Get all the facts about Hotpoint's 2-Way Profit Replacement Plan from your distributor or Hotpoint representative.

With only seven Stainless Steel Adapter Rings you can fit practically all makes of Electric Ranges now in use.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5612 West Taylor Street, Chicago, Illinois

Hotpoint
Calrod

THE ONLY ELECTRIC RANGE SURFACE UNITS WITH INCONEL SHEATH AND GLASS SEALED TERMINALS

3 WAYS TO A NEW CLAMP DESIGN

I.M. Here's the specs on that hollow conductor clamp. Suspension Clamp—Suitable for Hollow Core Conductors—J Bolts—Socket fittings; copper liners. Must be free from sharp corners. Slip strength; 2300 lbs.

BTC We'll have some prints out as soon as possible after contacting the cable manufacturer.

C.M. You won't have to baby our cable. Give us a good wrap and concentrate the pressure on the center.

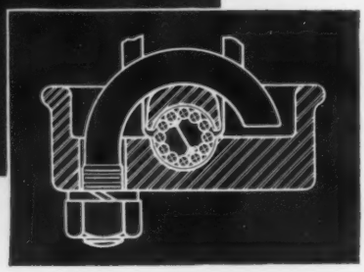
LATER

BTC Have you looked over that hollow conductor clamp? The wrap has a 90% enclosure on the conductor periphery. You like that contour, eh? We do, too. Yeh, not a sharp corner on the whole job.

C.M. The clamp's OK. by us. Seems like a nice job.

I.M. Now that you fellows have got together and the job is all set, let's get going.

BTC Have her rolling soon. Forging's our business and forgings you'll get.



THE BREWER-TITCHENER CORPORATION
Cortland, New York

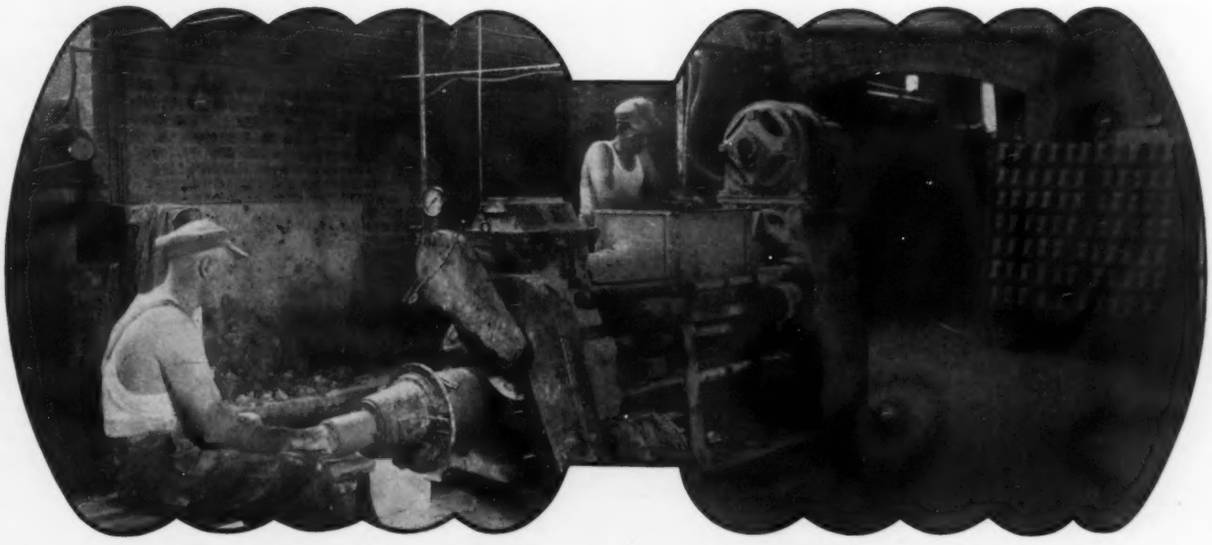
MORE THAN A FORGING
• • •
A SERVICE!

BTC

Specializing in Forged Hi-Line Hardware

ILLINOIS *eliminates*

INTERNAL STRESS IN PORCELAIN THRU VACUUM TYPE PUGG MILL PROCESS



★ One of the benefits of standardizing on Illinois Porcelain is that you experience no delays in shipments—by filling orders promptly we help you to eliminate production delays.

Send for latest catalog

Balanced Insulators-high dielectric strength high mechanical strength-exact dimensions

You get every important quality in Illinois porcelain because of the controlled steps in manufacturing.

After a porcelain mix is prepared, the plastic leaf clay is delivered to our modern pugg mill. Here the clay is run through the de-airing or vacuum type of pugg mill where it is cut up into very fine pieces giving the vacuum more surface upon which to work.

After this process, the clay is compressed under high pressure to insure uniformity throughout the piece and to eliminate internal stresses. It is then extruded to correct size.

Such steps in porcelain manufacture assure buyers of highest quality and dependable performance when they specify Illinois Porcelain.

Standardize on

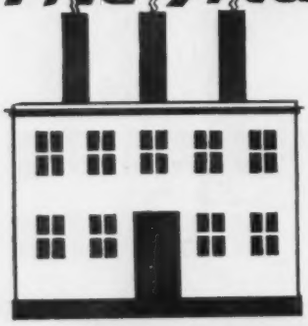
ILLINOIS

FOR TOP QUALITY AND EXACT DIMENSIONS——

ILLINOIS ELECTRIC PORCELAIN CO.
MACOMB, ILLINOIS

THE HENGER-SELTZER CO., LOS ANGELES, IS READY TO SERVE YOU

The Manufacturers' Directory



● In these pages is a directory of electrical manufacturers, their Western offices and Western representatives—a valuable source of buying information to the subscribers of ELECTRICAL WEST. It is as accurate and complete as the publishers could make it; no charge is made for a listing and every manufacturer operating in this territory is privileged to be included. ELECTRICAL WEST does not guarantee the information, however, and assumes no responsibility for errors or omissions. Subscribers are respectfully requested to notify the publishers of any corrections or additions that should be made.

● Under each manufacturer are listed the Western branch offices or representatives. Where such information is not listed, the manufacturer has no representation in the territory or has reported none. If the distribution of a product is through wholesalers only, this also is indicated. To use the directory, find the manufacturer's listing and call upon the nearest branch office or agent. If the name of the manufacturer is not known, turn to the "Where to Buy It in the West" guide immediately following and look under the name of the product in which you are interested.

A-A ELECTRIC MFG. CO., THE, Bridgeport, Conn.—Alexander W. Bromberg, Los Angeles.

ABOLITE REFLECTOR CO., West Lafayette, Ohio—Jos. Paulson, Portland; H. J. Kjaer, San Francisco; W. E. Welborne, Los Angeles; W. E. Young, Denver.

ACCURATE MFG. CO., Garfield, N. J.—F. J. Airey Co., Los Angeles; Frank D. Fagan Co., San Francisco.

ACME STEEL CO., Chicago, Ill.—Dist. Mgrs.: S. J. Johnson, Seattle; Harry Holm, Portland; G. J. Stewart, Vancouver; R. W. Chaffee, San Francisco; W. F. Tucker, Los Angeles.

ADAM ELECTRIC CO., FRANK, St. Louis, Mo.—Zinsmeyer, Inc., Los Angeles; Fred E. Staible, Inc., Denver; Wm. R. Miller, Albuquerque.

AJAX ELECTROTHERMIC CORP., Trenton, N. J.—E. A. Wilcox Co., San Francisco; J. Max Lee Co., Los Angeles; Fairman B. Lee, Seattle.

ALBANY SALES CO., New York, N. Y.—D. E. Sanford Co., Seattle, San Francisco, Los Angeles.

ALLEN-BRADLEY CO., Milwaukee, Wis.—Garland-Affolter Eng. Corp., Seattle, Portland, San Francisco; Zinsmeyer Co., Los Angeles; L. E. Belfort, San Diego; Peterson Co., Denver; Nickerson Machy. Co., Salt Lake City; C. F. Cate, El Paso; Industrial Machy. Co., Great Falls, Mont.

ALLIANCE MFG. CO., Alliance, Ohio—D. L. Herman, Seattle; Gillan Sales Co., San Francisco, Los Angeles, Denver.

ALLIED MERCANTILE CO., THE, Irvington, N. J.—C. R. Hunt, San Francisco.

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis.—Dist Mgrs.: A. J. Schmitz, Seattle; A. R. Kohlmetz, Spokane; F. V. Sams, Portland; F. C. Angle, San Francisco; A. D. Brown, Los Angeles; J. L. Singleton, Denver; B. A. Seare, Salt Lake City; O. F. Metz, El Paso.

ALL STEEL EQUIP. CO., INC., Aurora, Ill.—W. M. Sanderlin, Seattle; J. J. Noble, San Francisco; W. S. Sweet, Los Angeles; W. E. Young, Denver; L. V. Wilson, Phoenix.

ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa.—Sales Offices: Seattle, San Francisco, Los Angeles, Denver.

AMERICAN AUTOMATIC ELECTRIC SALES CO., Chicago, Ill.—District Offices: San Francisco, Los Angeles, Seattle.

AMERICAN BLOWER CORP., Detroit, Mich.—Branch Offices: Seattle, Tacoma, Portland, San Francisco, Los Angeles, Salt Lake City, Denver.

AMERICAN BRASS CO., Waterbury, Conn.—A. W. Gruss, Dist. Mgr., San Francisco.

AMERICAN ELECTRIC CABLE CO., Holyoke, Mass.—James C. Pope, Jr., Los Angeles; Jack K. Montgomery, Denver.

AMERICAN ELEC'L HEATER CO., Detroit, Mich.—R. G. Ellis, Los Angeles.

AMERICAN ELECTRIC SWITCH CORP., Minerva, O.—R. C. James, Seattle; Alexander W. Bromberg, Los Angeles.

AMERICAN FELT CO., Chicago, Ill.—F. J. Klenck Co., Seattle, Portland, San Francisco, Los Angeles.

AMERICAN FLEXIBLE CONDUIT CO., New Bedford, Mass.—Albert S. Knight Co., Seattle; Walter S. Sweet, Los Angeles.

AMERICAN LAVA CORP., Chattanooga, Tenn.—Electric Material Co., San Francisco, Los Angeles.

AMERICAN MICROPHONE CO., INC., Los Angeles, Calif.

AMERICAN PHENOLIC CO., Chicago, Ill.—Don H. Burcham, Portland; J. P. Hermans, San Francisco.

AMERICAN SAFETY APPLIANCES CO., San Francisco, Calif.—Sold through leading electrical wholesalers.

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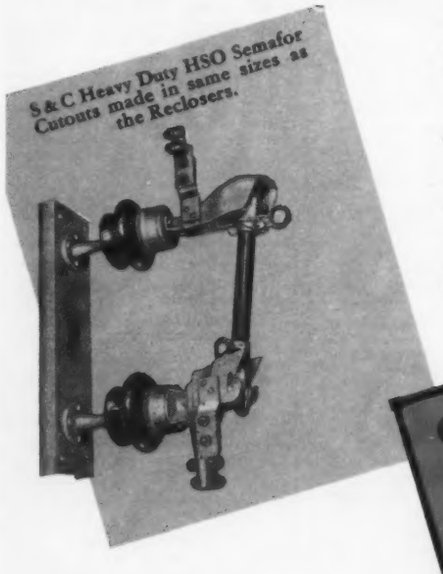

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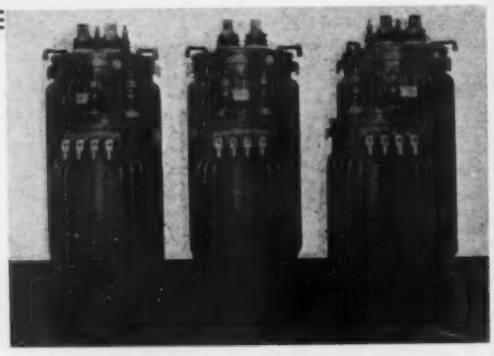

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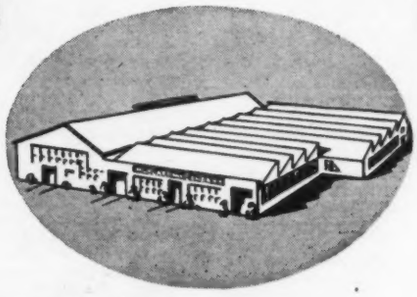

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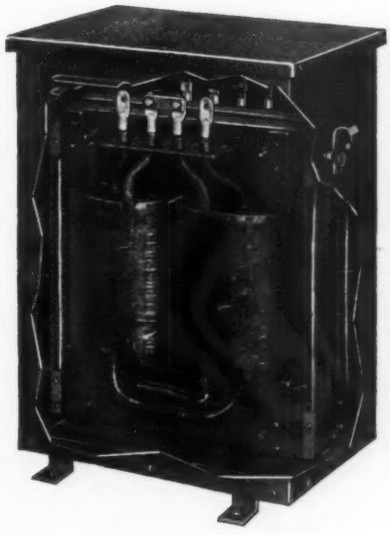

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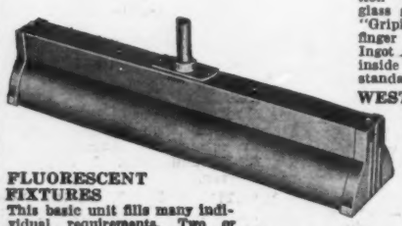

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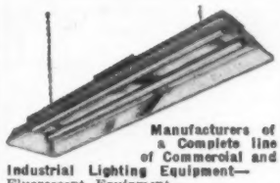

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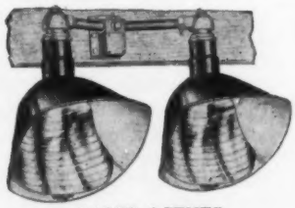

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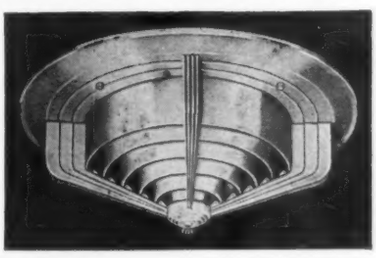

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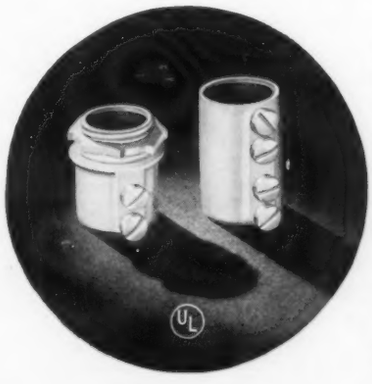

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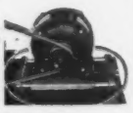
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Lapp Insulator Co., Inc.
Standard Elec'l Porcelain Mfrs.
The R. Thomas & Sons Co.
Victor Insulators, Inc.
Westinghouse Elec. & Mfg. Co.
Preservatives, Wood
Geo. E. Honn Co.
Osmose Wood Preserving Co. of America, Inc.
Protectors, Guy Wire
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General Elec. Co.
Geo. E. Honn Co.
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Line Material Co.
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The Specialty Device Co.
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California Oregon Power Co.
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Edwin L. Wiegand Co.
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Roller-Smith Co.
Square D Co.
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Rods, Anchor & Guy
A. B. Chance Co.
Copperweld Steel Co.
General Elec. Co.
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Line Material Co.
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Van Cleef Bros.
Rural Line Hardware
Graybar Elec. Co., Inc.
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Crocker First National Bank
Elec'l Testing Labs.
Hotel Oakland
McGraw-Hill Book Co.
National Carloading Corp.
Northwest Elec. Light & Power Association
Pacific Coast Elec'l Bureau
Pacific Coast Elec'l Ass'n
R L M Standards Institute
Rocky Mt. Electrical League
Shafts, Flexible
Swartz & White Mfg. Co.
Strand, Guy
Copperweld Steel Co.
C. E. Ingalls
Maydwell & Hartzell, Inc.
Street Lighting Fixtures
General Elec. Co.
Graybar Elec. Co., Inc.
Hubbard & Co.
Line Material Co.
Westinghouse Elec. & Mfg. Co.
Surface Raceway and Fittings
Square D Company
Wiremold Company
Switchboards
Allis-Chalmers Mfg. Co.
General Elec. Co.
Graybar Elec. Co.
Meyers Safety Switch Co.
Mongerson's Elec'l Mach. Works
Roller-Smith Co.
Square D Co.
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Maydwell & Hartzell, Inc.
Sangamo Electric Co.
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Pacific Elec. Mfg. Corp.
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General Elec. Co.
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General Elec. Co.
Kearney Corp., James R.
W. N. Matthews Corp.
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Schweitzer & Conrad, Inc.
Switches, Heater
General Elec. Co.
Switches, High Tension
Bowie Switch Co.
Condon & Young
James R. Kearney Corp.
Pacific Elec. Mfg. Co.
Schweitzer & Conrad, Inc.

IDEAL MARKING TOOLS
The most complete line of electric marking equipment
ELECTRIC MARKER
—Permanently marks all materials including ordinary metals. Delivers 7200 cutting strokes per minute. Diamond point available.

ELECTRIC ETCHERS
—Engrave smooth surface steel and iron. Standard and Heavy Duty Models available. For a.c. only.
Ideal Commutator Dresser Co.
1030 Park Ave. Sycamore, Ill.

Switches, Meter Test
General Elec. Co.
Kwikon Co.
L. A. Nott
Square D Co.
Superior Switchboard & Devices Co.

Switches—Pressure and Temperature
Square D Co.

Switches, Remote Control
General Electric Co.
Roller-Smith Co.

Switches, Safety
Colt's Patent Fire Arms Mfg. Co.
General Elec. Co.
McGill Mfg. Co.
Meyers Safety Switch Co., Inc.
Mongerson's Elec'l Mach. Works
Square D Co.
Westinghouse Elec. & Mfg. Co.

Switches, Thermostat Controlled
Colt's Patent Fire Arms Mfg. Co.
General Elec. Co.

Switches, Time
General Elec. Co.
Maydwell & Hartzell, Inc.
L. A. Nott
Reliance Automatic Ltg. Co.
Sangamo Elec. Co.
The Tork Clock Co., Inc.
Tom Wood

Switchgear
Allis-Chalmers Mfg. Co.
General Elec. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.

IDEAL FISH TAPE, REELS AND PULLERS

"3 tools in 1." Keeps tape safely enclosed in reel at all times. Furnished in seven sizes. Tape lengths from 50 ft. to 400 ft.

Ideal Commutator Dresser Co.
1030 Park Ave., Sycamore, Illinois

Tapes—Friction or Rubber
Appleton Rubber Co.
Clifton Mfg. Co.
General Elec. Co.
Graybar Elec. Co.
Geo. E. Honn Co.
Ideal Commutator Dresser Co.
Johns-Manville Corp.
Marwood Limited
Jas. J. Noble Co.
Okonite Company
Van Cleef Bros.
Westinghouse Elec. & Mfg. Co.

Telephone & Telegraph Hardware & Specialties
Graybar Elec. Co., Inc.
Hubbard & Co.
Maydwell & Hartzell, Inc.
National Tel. Supply Co.

Terminals, Cable
Burndy Eng'g Corp.
General Cable Corp.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Testing Devices
American Transformer Co.
Ken H. Best
Ideal Commutator Dresser Co.
L. A. Nott
Schweitzer & Conrad, Inc.
The States Co.
Superior Switchboard & Devices Co.
Tom Wood

IDEAL ELECTRIC SOLDERING TOOLS

THERMO-GRIPS: Heat instantly, use current only when soldering. Many sizes and styles. NO. 1 "INSTANT HEAT"—For light soldering work in service and repair work.

Ideal Commutator Dresser Co.
1030 Park Ave. Sycamore, Ill.

Tools
Briegel Method Tool Co.
A. B. Chance Co.
General Elec. Co.
Greenlee Tool Co.
Ideal Commutator Dresser Co.
James R. Kearney Corp.
Line Material Co.
Mathias Klein & Sons
Maydwell & Hartzell, Inc.
Trico Fuse Co.
Westinghouse Elec. & Mfg. Co.

Transformers
Allis-Chalmers Mfg. Co.
American Transformer Co.
Gardner Elec. Mfg. Co.
General Elec. Co.
Geo. E. Honn Co.

WUELKER BABY WHITE KITTEN LIGHTING UNITS

Flexo-Domes . . . Wuelkerlites . . . Adjus-To-Angles
Floodlighting Interiors & Exteriors . Theatrical Lighting
Show Window Lighting . . . General Illumination
In-built Units with Fresnel Lenses or Beaux Art Glass
LIGHTING UNITS MADE TO ORDER
Many Wuelker Units Are Installed at the Fair

WUELKER LIGHTING CO.
889 PACIFIC AVENUE SAN FRANCISCO, CALIF.

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W. W. Kirk
Line Material Co.
Moloney Electric Co.
Roller-Smith Co.
Wagner Electric Corp.
Western Transformer Co.
Westinghouse Elec. & Mfg. Co.
Tom Wood

Tubing, Elec'l Metallic
Aluminum Co. of America
Youngstown Sheet & Tube Co.

Turbines
Allis-Chalmers Mfg. Co.
General Electric Co.
Pelton Water Wheel Co.
Westinghouse Elec. & Mfg. Co.

Valves
Pelton Water Wheel Co.

Varnishes, Insulation
John C. Dolph Co.
General Elec. Co.
Marwood Limited
Westinghouse Elec. & Mfg. Co.

Washers, Clothes
Edison Gen. Elec. Appliance Co.
General Elec. Co.
Kelvinator Division
Landers, Frary & Clark
Westinghouse Elec. & Mfg. Co.

Wattmeters
General Elec. Co.
L. A. Nott
Roller-Smith Co.
Sangamo Elec. Co.
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Pelton Water Wheel Co.

Welding Equip. & Accessories, Elec.
American Transformer Co.
General Elec. Co.
Stone-Ryals Elec. & Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Wire
Aluminum Co. of America
American Steel & Wire Co.
Anaconda Wire & Cable Co.
Columbia Steel Co.
Condon & Young, Inc.
Copperweld Steel Co.
Crescent Ins. Wire & Cable Co.
Driver-Harris Co.
General Cable Corp.
General Electric Co.
Hazard Ins. Wire Works
Indiana Steel & Wire Co.
C. E. Ingalls
Marwood Limited
Maydwell & Hartzell, Inc.
National Elec. Products Corp.
The Okonite Company
John A. Roebling's Sons Co.
Triangle Conduit & Cable Co., Inc.
United States Steel Corp.
Westinghouse Elec. & Mfg. Co.

IDEAL Wire Strippers

The most complete line on the market. Hand, foot operated and power driven units. Models for stripping all types and sizes of insulated and lacquered wire and cable.

Ideal Commutator Dresser Company
1030 Park Avenue
Sycamore, Illinois

Wiring Supplies
Graybar Elec. Co., Inc.
Lew Fittings Co.
McGill Mfg. Co.

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Lemmon Succeeds Campbell at Sierra Pacific

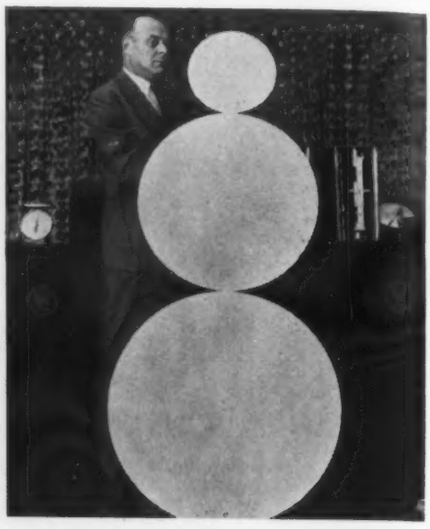
H. A. Lemmon has been elected vice president and general manager of the Sierra Pacific Power Co., Reno., Nev., succeeding the late George A. Campbell as operating head. Born in Sierra Valley among the California Mother Lode mining camps in 1873, Lemmon left school when he was 14, going to San Francisco where he learned the printing trade. A few years later he was editor and publisher of a newspaper at Amadee, Calif.

He later moved to Nevada where he acquired the newspaper at Carson City, selling it shortly after the Goldfield mining boom in 1906. His first association in the utility business was with the late Frank G. Baum, noted hydro-electric engineer, for whom he acted as Nevada representative. In 1907, Lemmon became agent for the Nevada-California Electric Power Co., one of the predecessors of Sierra Pacific Power.

In 1919 the Stone & Webster organization moved him to Halifax, Nova Scotia, as sales manager of the power company there. In 1920 he was called to Boston to act as personnel manager for all Stone & Webster utilities. In the next 11 years he traveled over all of the Stone & Webster properties. After a short period of ill health, he returned to Reno in 1931 as sales manager of the Sierra Pacific Power Co. He was elected a vice-president three years ago. While sales manager he developed the highly successful "Reno" or "Lemmon" plan of dealer cooperative merchandising which has since been widely copied. Success of this plan is demonstrated by Sierra Pacific's appliance saturations: 57% for electric ranges, 16% for water heaters and 68% for electric refrigerators—record figures for a combination company.

PROFILES OF THE MONTH

William B. Bonnett has been moved up from district sales supervisor, Puget Sound Power & Light Co., to succeed Charles Hess as merchandise supervisor of the company at Seattle



These white circles held by George F. Begoon, show the relative size of pollen and ash particles taken from the air by the Precipitron, a new Westinghouse electrostatic air cleaner

Ralph E. Johnson is chairman of the Rocky Mountain Electrical League, Denver, and is the newly appointed head of its Contractors' Division, according to George Lewis, manager

Charles P. Culbert, general sales manager, Proctor Electric Co., Philadelphia, has been appointed Western sales manager. He will establish his home and headquarters at Los Angeles

Mr. and Mrs. R. E. Gale attend the Northwest Electric Light & Power Assn. meeting at Seattle. Mrs. Gale was the former Helen M. Swanson, home service director, Idaho Power

E. E. Schwartz (right), director works laboratory, G-E, Bridgeport, is visiting the West to explain the new thin-wall wire to such men as Walter J. Delehanty, G-E representative, S. F.

It's no Secret now!

YOUR 1940
ELECTRIC REFRIGERATOR CAMPAIGN
WILL BE HELD APRIL 8 to MAY 4, INCLUSIVE

• • •

Never Before have there been such bargains in electric refrigerators.

Never Before has the public been offered so much for the money.

Never Before has advertising had such a price and value appeal to draw prospects into your store.

Get set now to cash in on the golden opportunity from April 8 to May 4, and get your share of refrigerator profits.

ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA 1355 MARKET ST. SAN FRANCISCO

Your own
GARDEN OF DREAMS
ADEQUATE WIRING
In any language it means COMFORT, CONVENIENCE and BETTER LIVING
What would you like to know about lighting your home?
The Wires Go Round & Round And Come Out Here
Where When What How Why Who
Ike and Mike May Look Alike BUT—
LIGHT CONDITIONING

Adequate wiring and better lighting are being promoted in the West continually by hundreds of advertisements. Newspapers and magazines find interest in these subjects so keen that they devote many columns of space to stories and pictures concerning them.

During 1940 the advertising carried on for many years past will be continued in Western magazines, and stories will continue to appear in magazines and newspapers and be heard on the radio and from the speakers' platform.

This wide dissemination of information has attracted public attention and created an attitude favorable to adequate wiring and better lighting.

That of course means **your** public—your customers and potential customers. They know something of the story now. You should tell it to them in more detail. Let them know that you are ready to serve them. Someone is going to make the sale to these live prospects—why shouldn't it be you?

PACIFIC COAST *Electrical* **BUREAU**

447 SUTTER STREET, SAN FRANCISCO • 601 WEST 5TH STREET, LOS ANGELES